US Army Corps of Engineers

FY09 USACE LEED Implementation Workshop

Provided by HQUSACE SDD
Technical Proponent
USACE Army LEED Implementation Guide

Introduction, Requirements, Responsibilities, Resources

Handout

- Workshop Schedule
- Acronyms List
- Slides for all sessions with note space
- LEED Registered Project Checklist filled in for currently observed point trends
- USACE LEED Documentation Requirements and Submittals Checklist

Not in Handbook but should be a copy at each desk (obtain at https://ten.usace.army.mil/TechExNet.aspx?p=s&a=AreasOfExpertise;522 or http://en.sas.usace.army.mil, “Engineering Criteria”):

- USACE Army LEED Implementation Guide

Feedback forms – comments & suggestions on workshop, future HQUSACE support initiatives

Command Emphasis

- Executive Orders
- DoD signer of Federal Environmental MOU
- Laws (EPAct 2005, EISA 2007)
- Army, Air Force Mandates and Policy
- USACE criteria
- HQUSACE monitoring of projects
- Highest level emphasis in USACE

Continued and increasing expectations from the very top!! There is a LEED Police!!

Energy Policy Act (EPAct) 2005 (Public Law 109-58)

All Federal Facilities:

If life-cycle cost effective:

- **Apply sustainable design principles to siting, design & construction**
- **Design buildings to achieve energy consumption levels 30% below ASHRAE 90.1 baseline**
- **Use water conservation features to achieve energy efficiency**
- **Use advance meters to provide daily data that measures hourly consumption, incorporate into EMCS, make data available to facility/energy manager**

Use Energy Star or FEMP designated products

Report new building compliance status

Install electric meters at all buildings by 2012

All Federal Agencies:

- **Reduce energy consumption/gsf by 2% annually through 2015 (20% total with 2003 baseline year)**
- **To the extent economically feasible and technically practical, supply the following percentage of total electrical demand from renewable resources:**
  - **3% for FY2007-2009**
  - **5% for FY2010-2012**

Executive Order 13423: Strengthening Federal Environmental, Energy and Transportation Management

All Federal Facilities:

Comply with the Guiding Principles MOU (including 15% of existing buildings by 2015)

All Federal Agencies:

- **Reduce energy consumption 3% annually, 30% by 2015**
- **50% of required renewable energy new (installed after 1999)**
- **Reduce water consumption 2% annually**
- **Purchase EPPs**
- **Reduce purchase of toxic products, recycle, divert solid waste**
- **Reduce fleet petroleum consumption 2% annually through 2015**
- **Electronic equipment EPEAT registered, Energy Star**

Energy Independence and Security Act (EISA) 2007 (Public Law 110-140)

All Federal Facilities:

If life-cycle cost effective:

- **Reduce fossil fuel-generated energy consumption 55%by 2010, 100% by 2030**
- **30% of hot water demand met by solar water heaters**
- **Projects greater than 5000sf restore predevelopment hydrology**
- **Use water conservation technologies**

Meter natural gas and steam

Goal of 3% energy reduction per year (30% by 2015)

Purchase Energy Star lamps & fixtures, appliances with standby power

All Federal Agencies:

Obtain external certification of 5% of buildings

- **To the extent economically feasible and technically practical, supply 25% of total electrical demand from**

MOU Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings

All Federal Facilities:

If life-cycle cost effective:

- **Reduce energy cost budget new construction 30%, renovation 20%**
- **Use integrated design and whole building commissioning**
- **Energy Efficiency (30% reduction), install utility meters**
- **Reduce potable water use indoors 20%, outdoors 50%**
- **Indoor Environmental Quality: thermal comfort, moisture control, daylighting, low-emitting materials, air quality protection during construction (flushout)**
- **Materials: recycled content (EPA), biobased (USDA)**
- **50% construction waste diversion**
- **Eliminate ozone depleting compounds**

Document in High Performance Buildings Database

Recycled Content: EPA Comprehensive Procurement Guidelines (CPG)

Biobased Content: USDA Federal Biobased Products Preferred Procurement Program (FB4P)

- Mandatory all federal agencies (Public Law)
  - If the agency designates a product, we must buy it with their recommended recycled/biobased content unless we have justification for non-use
    - Technically unsuitable
    - Unavailability
    - Prohibitive cost
    - Prohibitive schedule impact
  - Example EPA designated products: concrete, rigid and batt insulation, metal roofing
  - USDA designations effecting buildings currently limited (lubricants, linens)

Current Requirements (Army)

- Beginning FY08, All new construction & major renovation – LEED-NC Silver (minimum 33 LEED points)
- Regardless of funding source - includes OMA, BRAC, tenant organizations (SOF, DoD)
- Army Family Housing & Residential Communities Initiative – still SPIRIT Gold
- 50% waste diversion mandatory
- Energy reduction mandatory (EPAct) – MT 30% regardless of LCC, non-MT based on life cycle cost analysis
- (USACE) LEED Accredited Professional (AP) required all design and construction teams
- Certifiable - “Able to achieve USGBC certification if submitted”
- Beginning FY09, all Silver requirement projects must be registered and use LEED Letter Templates
- Coming requirement: 5% of projects USGBC certified

Exemptions (Army)

Exempt means exempt from LEED Silver, NOT exempt from LEED altogether – must earn mandatory and all feasible points.

LEED Silver exemption for buildings **not climate controlled**

- Climate control is defined as mechanically heated and/or cooled for human comfort.
- Any amount of climate control – building not exempt.

LEED Silver exemption for **horizontal construction**

- Horizontal construction is on or under the ground (no buildings) such as airfield, roads, utilities, bridges.
- Climate controlled building in range or other horizontal construction projects – building is **not** exempt.

Exemptions (Army)

LEED Silver exemption for overseas contingency construction and CONUS interim facilities

- Interim facility requirement is short term (normally 3 years or less) urgent requirement due to transitory peak military missions, deployments, military contingency operations, disaster relief, or pending approval and construction of real property facilities via normal military construction programs.

LEED Silver exemption for renovation and repair projects that are NOT defined as Major Renovation

- Major renovation is renovation that exceeds garrison commander funding authority AND has a repair to replacement ratio equal to or greater than 25%.

Failure, Waivers (Army)

- If, after budget lock, project cannot meet LEED requirement within funds available, PDT submits change request IAW AR 420-1, Chapter 4 (Installation chain and USACE chain).
  - Submit request as soon as failure is known, but no later than next prescribed reporting point.
- If, at construction completion, the required level is not achieved, PM will prepare and submit Lessons Learned report to HQUSACE RIT Program Manager and E&C cost engineering POC explaining reason for failure.

Current Requirements (Air Force)

- Prior to FY09, selected projects are required to achieve various LEED scores, certification on a case-by-case basis
- Beginning FY09, All new construction & major renovation – LEED-NC Silver
- *Horizontal construction (airfield, roads), utilities, industrial facilities – lower LEED score required
- *EPAct energy reduction based on life cycle cost analysis
- (USACE) LEED AP required all design and construction contractors
- Certifiable - “Able to achieve USGBC certification if submitted”
- Beginning FY09, 5% of projects will be selected for formal certification by USGBC

USACE Army LEED Implementation Guide applies to AF projects with minor (*) exceptions

Our Environmental Yardstick: LEED-NC (V2.2)

- Leadership in Energy and Environmental Design for New Construction and Major Renovation
- Created and maintained by U.S. Green Building Council (USGBC) - nonprofit industry-based organization
- Private sector industry standard for green building achievement
- Objective, measurable
- 6 Categories, 69 points
- Meet the requirements, earn the point
- Wide range, some points mutually exclusive
- Each project picks the most feasible points
- 4EA achievement levels: Certified, Silver, Gold, Platinum, based on number of points earned.
- LEED Silver = minimum 33 points.

USGBC will issue LEED 2009 in Spring 2009. Army will evaluate and issue written guidance. Hold course with V2.2 until guidance is received

How Projects are Scored with LEED

- LEED has building points, site selection points, site design points, shared and aggregate (both building and site contribute) points.
- Each non-exempt building plus site must attain LEED Silver
- Projects with multiple buildings: use USGBC publication Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC) to generate one project score for whole project
  - Which points are tallied on a whole-job basis (waste diversion)
  - Which points must be documented separately for each building (commissioning)
  - Special scoring allowances unique to campus environment (consolidated parking)
- Renovations and additions: points are generally scored based on scope of project (if, then). LEED–NC is intended for both new construction and major renovation.

Other Rating Tools

By USGBC:

- **LEED-EB for Existing Buildings: Operations & Maintenance emphasis, minor renovations, several points dependent on O&M practices**
- **LEED-CI for Commercial Interiors: fit-out and furnishing of built space (MEDCOM)**
- **LEED-CS for Core & Shell: development of lease space to be fit out by others**
- **LEED for Schools: Similar to NC except emphasis on school environment (USGBC will not certify a school under LEED-NC) (DoD Schools)**
- **LEED for Homes: Points and certification system different, oriented to small residential**
- **LEED-ND for Neighborhood Development: Points system for city/master planning**

By Others:

- **OCONUS host nation standards (Germany)**

If on Army property & User wants to use a rating tool other than LEED-NC, must obtain permission from ACSIM (demonstrate equivalency)

Army MILCON Transformation (MT)

- USACE response to unprecedented Army construction program needs
  - Driven by:
    - Army reorganization
    - BRAC
    - OCONUS re-stationing
    - Grow the Force initiative
- Critical execution schedules
- Full scope execution is required
- Limited funds – execution within funds available is critical

"Cheaper, Better, Faster, Greener"

Where We Are Today in the MILCON Transformation Process

- Performance RFP, not prescriptive
- Industry Standards
- Uniform RFP all USACE Districts (mandatory wizard)
- Emphasis on proposals meeting funds available
- Emphasis on schedule/contract duration
- ACSIM is the Customer – no deviations without ACSIM approval
- IDG incorporated to extent does not jeopardize award within funds available

Partner with industry, attract innovative solutions, focus on total program execution

MILCON Transformation and LEED

- LEED made the cut – testament to Army's commitment
- Life-cycle paybacks
  - Utility costs
  - Occupant performance
  - Environmental costs
- DB Proposers select points

COS Continuous Build Concept

- Army needs high degree of facility standardization to support mission, unit mobility
- COS enforces compliance, is life-cycle manager of standard design
- Transition from performance RFP to Adapt-build
- COS regional IDIQ contracts for standard designs
- Geographic district responsible for site improvements outside the 5 foot line
- COS and GD coordinate on contract packaging of building and site work (building with site, building only, site work only contracts)

COS Continuous Build Concept and LEED

- Building and site by separate parties requires greater Government coordination (Multiple Contractor Combined Project)
- COS Standard design management includes management of LEED documentation to eliminate duplication of effort
- New activities required by geographic district and COS to manage LEED when building and site are by separate parties

Validating LEED Achievement

- LEED documentation is how claimed credits are validated
- Every credit and prerequisite has specific documentation requirements
- Design and construction phase documentation
- Always required
- Cost of preparing LEED documentation greater than certification cost
- Included in design and construction costs

USGBC Project Certification

- Independent 3rd party USGBC review of all project LEED documentation and ruling on number of points earned.
- Costs from $2,000 to $20,000 depending on sf
- Separate activity from USGBC Project Registration
- Takes place after construction closeout (can request interim review at final design)
- Only selected USACE projects will seek USGBC certification

LEED “Certifiable”

- Government Validation versus USGBC Certification
- USACE District is responsible for applying USGBC standards, reviewing project LEED documentation for conformance and determining rating (USGBC function)
- Government Validation is default for all projects (even when USGBC certification is required)

LEED Documentation

ALL PROJECTS HAVE:

- Design phase documentation (final design)
- Preconstruction phase documentation
- Documentation accumulated during construction
- Large closeout submittal

Documentation Content

- Match USGBC documentation requirements (“certifiable”)
- What required & when for ALL PROJECTS is contained in USACE document “LEED Documentation Requirements and Submittals Checklist” (design through construction closeout)
- Some differences from USGBC requirements because USACE is an interested party in outcome
- Differences are noted on checklist
- Include in all DB, full design, construction contracts

http://en.sas.usace.army.mil, “Engineering Criteria”

LEED Letter Templates

- USGBC Preformatted fill-in-the-blank credit documentation forms with built-in calculators – one Letter Template for each credit
- Each form identifies required attachments
- Available to USGBC Registered Projects ONLY (copyright protected)
- May compile at LEED Online but hard copies currently still required.
- LEED Silver projects MUST use LEED Letter Templates (PDTs may require their use on exempt projects).
- USGBC Certification projects MUST use LEED Letter Templates.
- Multiple Contractor Combined Projects (COS – building and site by separate contractors) ALL PORTIONS require use of LEED Letter Templates.
- Sample set of LEED Letter Templates available for review ONLY at usgbc.org (copyright)

Project USGBC Registration

- Costs $450 per project.
- Not the same as, creates no future obligation to seek USGBC project certification.
- Project can be registered by PM, AE or design team, DB contractor.
- Standard designs registered by COS.
- Needed at start of full design (drawings & specs).
- Upon registration, online project set of LEED Letter Templates is created – website for all project documentation to be compiled
- Each registered project assigns one Project Administrator, who controls access and save/modify data privileges for all team members (can set up Government view access).
- May reassign Project Administrator, but only one at any given time.
- Download blank template, fill in and upload
- Upload attachments
- Multiple buildings: Download duplicate blanks, fill in for each building, upload all as attachments

Registered Project Administration Options – Performance RFP DB

- Single Contractor doing building & site: require DB Contractor to register and administer.
- District may register and administer project (furnish applicable templates to RFP Preparer, DB Contractor to fill in and return).

Registered Project Administration Options – DB With Partial Mandatory Design

- RFP Preparer prepares design documentation for mandatory design elements (ex: views credit/mandatory floor plan)
  - RFP Preparer registers project, transfers administration to DB contractor after award

- District may register and administer project (furnish applicable templates to RFP Preparer, DB Contractor to fill in and return).

Registered Project Administration Options – Design Bid Build

- Designer of Record prepares design phase documentation
  - Designer registers project, transfers administration to construction contractor after award
  - OR Designer of Record administers during construction phase (include in scope of construction services)
- District may register and administer project (furnish applicable templates to Designer, Contractor to fill in and return).

Registered Project Administration – Closeout (All Projects)

- Registered project contains all design and construction phase LEED documentation
- Copy and retain completed set of LEED documentation in USACE project file
- Transfer administration to Installation if desired (needed if Installation decides to seek USGBC certification or register building for LEED-EB)
  - or
- De-activate online project (call USGBC)

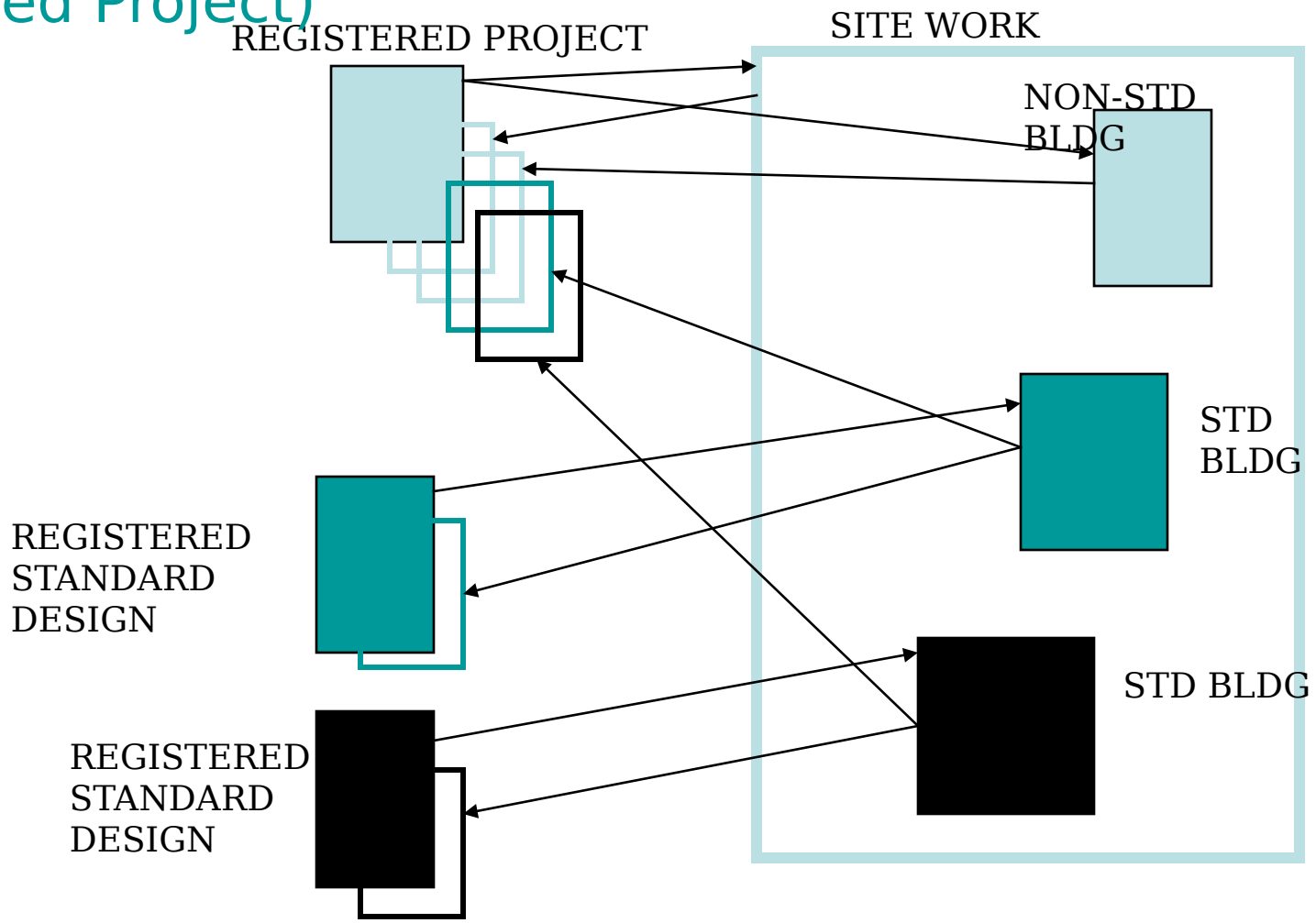
Building and Site by Separate Contractors

Multiple Contractor Combined Project LEED Registrations

- ALL Contractors are required to use LEED Letter Templates for consistent documentation format
- REGISTERED PROJECT is defined by scope of site work – site work and non-standard buildings get templates at Registered Project
- REGISTERED STANDARD DESIGNS are administered by COSs – standard design buildings get templates at Registered Standard Design
- All parties' completed templates compiled at Registered Project
- Selected standard design completed templates are also compiled at Registered Standard Design for future use.

COSs must develop procedures/assignments for administering Registered Standard Designs

LEED Registrations (Multiple Contractor Combined Project)

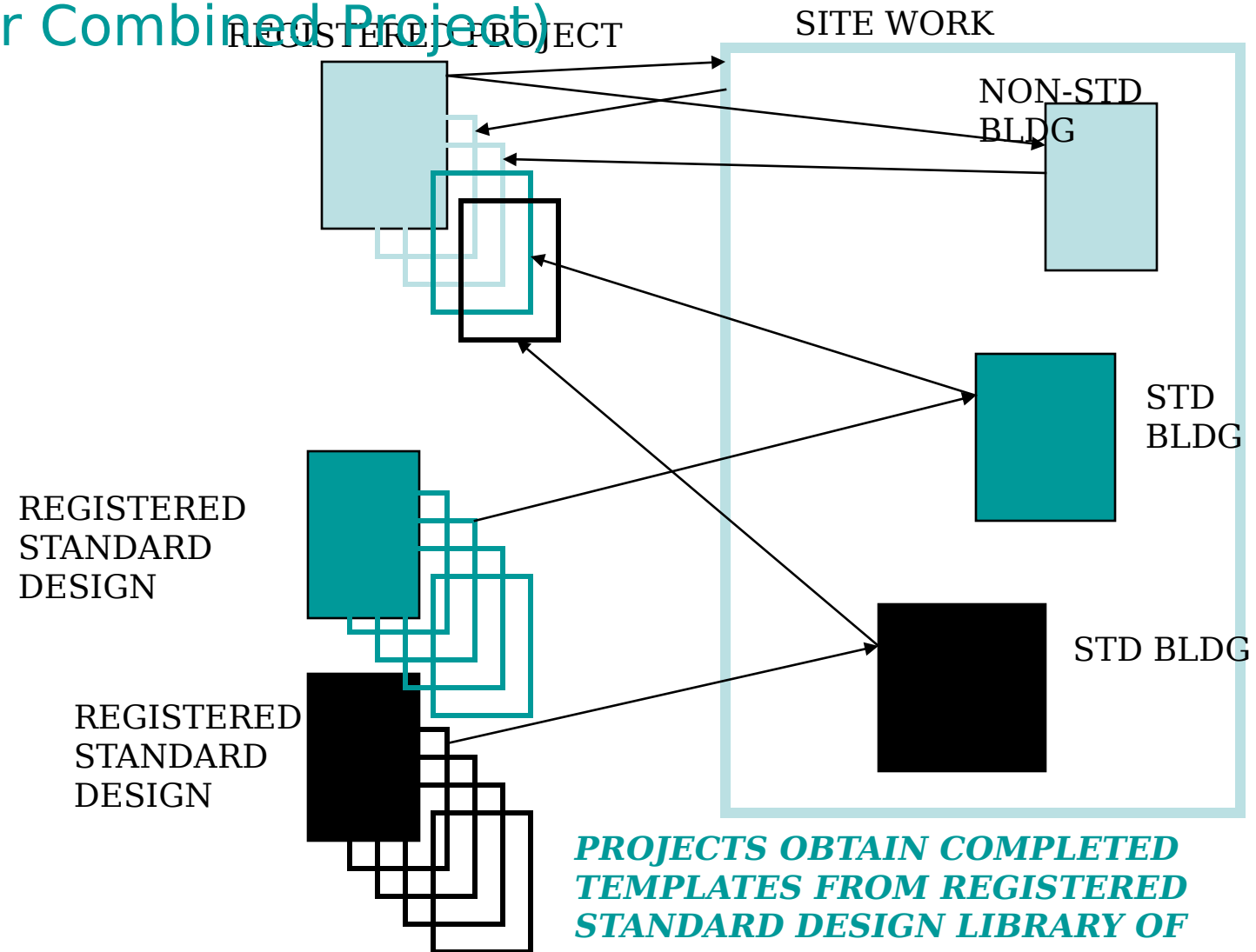


Multiple Contractor Combined Project

Registered Standard Designs – COS

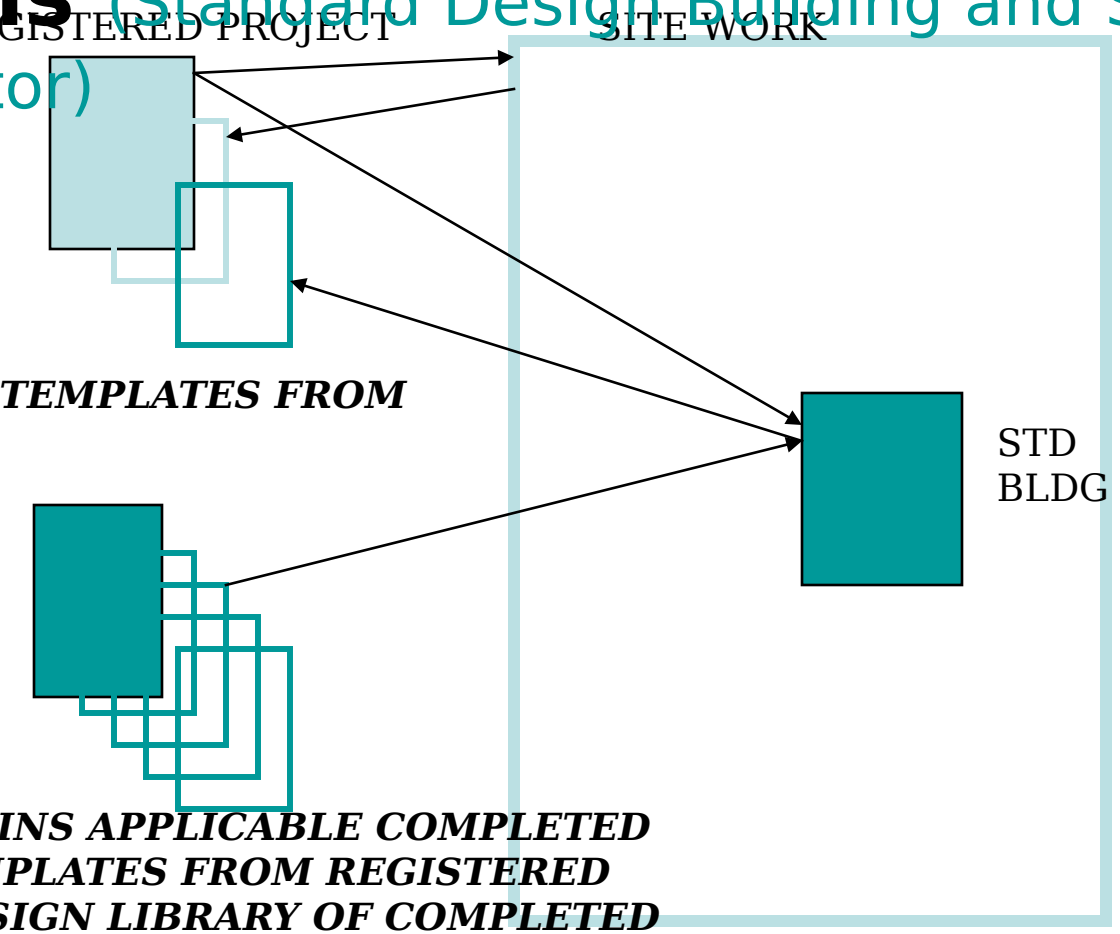
- COS registers and administers standard design
  - Provide blank building letter templates to COS building-only DB contractors
  - Collect completed letter templates from COS building-only DB contractors
  - Make library of completed templates available to future COS DB contractors
  - Develop set of completed templates for mandatory elements of standard design as standard design moves toward site-adapt (do not require creation of duplicates of completed templates)

Future – LEED Registrations (Multiple Contractor Combined Project)



COS Single Contractor LEED Registrations (Standard Design Building and Site by Same Contractor)

CONTRACTOR REGISTERS PROJECT – ALL BUILDING AND SITE TEMPLATES COMPILED AT REGISTERED PROJECT



PROJECT OBTAINS BLANK TEMPLATES FROM REGISTERED PROJECT

PROJECT OBTAINS APPLICABLE COMPLETED BUILDING TEMPLATES FROM REGISTERED STANDARD DESIGN LIBRARY OF COMPLETED TEMPLATES TO USE FOR PROJECT DOCUMENTATION

Reporting – Prescribed Reporting Points (Army)

At each prescribed reporting point, District-validated rating will be coordinated with and endorsed in writing by Installation DPW or reserve component equivalent, COS if applicable, designer and constructor as applicable. Endorsed LEED Project Checklist (signed or initialed by all parties) will be placed in project file by PM.

Design-Bid-Build Prescribed Reporting Points:

- Planning Charette
- Parametric/Code 3 Submittal
- Final Design
- Construction Closeout

Design-Build Prescribed Reporting Points:

- Planning Charette
- Parametric/Code 3 Submittal
- Conformed Proposal
- Construction Closeout

Purpose is to ensure Installation awareness and buy-in

P2 Reporting (Army)

General - LEED rating is “current” until project closeout, when it becomes “final”. LEED rating is only “pending” BEFORE initial charette when project LEED requirement is determined.

- Throughout life of project report “current” rating (planned/assumed achievement level).
- Only report “pending” prior to initial charette

Silver Exempt Projects: At rating indicate “N/A”. In comments block indicate rating tool used (SPIRIT or LEED) and actual current rating.

Multiple Building Projects: Report single project rating in accordance with AGMBC.

Air force is developing it’s own reporting system – USACE to beta test in FY08

LEED Responsibilities and Staffing

Who does what, How to Organize for Success

Project Manager

- Ensure LEED AP is required on AE teams
- Manage USGBC Registration strategy (who does what) if required
  - Initial registration
  - Transfer at construction award
  - Closeout transfer to Installation (or USGBC closing)
- Manage USGBC Certification strategy (who does what) if required
  - Application, fees
  - Coordination with USGBC
- Manage AE/Designer services during construction:
  - Identify and FUND preparer of CxA Commissioning activities & report at closeout (DBB)
  - USGBC certification coordination
- P2 Reporting
- Army Prescribed Reporting Points coordination & endorsed checklist in project file
- Ensure completed LEED documentation is in project file (DBB combine design, construction documentation)

Engineering

- Ensure LEED AP is on design team
- Incorporate LEED requirements in AE technical instructions
- Review pre-design and design submittals by others for LEED
- Prepare in-house pre-design and design submittals incorporating LEED, prepare LEED documentation
- Provide Commissioning Authority services if have capability and if requested:
  - CxA activities during design, construction
  - Commissioning report at closeout (DBB)
- Provide technical support to CD if requested:
  - Preconstruction submittal review
  - Closeout LEED submittal review
  - Participate in pre-closeout and closeout LEED review meetings
- Administer registered in-house projects, registered projects by others if requested (District mgt decision)

Construction Administration Team

- Ensure LEED AP is on Contractor team
- Manage preconstruction submittals
- Ensure construction phase documentation is kept current monthly
- Monitor progress on materials credits, coordinate corrective action if goal is not being met
- Observe compliance with contract LEED requirements in field
- Coordinate commissioning and preparation of commissioning report
- Coordinate occupancy with flush-out/IAQ testing if applicable
- Forward Contractor quarterly & final waste diversion reports to Installation waste management POC
- Coordinate closeout LEED submittal, pre-submittal and post-submittal review meetings (PM, designer, installation rep)

Pre-design and Design Phase Technical Responsibilities

- LEED is multidisciplinary – no one person is technically qualified for all points
- Assign each discipline responsibilities for each credit (includes coordination leads)
- Assign responsibilities for general topics (USGBC registration, LEED AP, overall score, documentation requirements)

SAS: Architect covers the general topics for activities where team does not include LEED AP

SAS Technical Responsibilities Spreadsheet

EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	ALL	**Owner's Project Requirements document
		MECH, ELEC	**Basis of Design document for commissioned systems
		MECH, ELEC	**Commissioning Plan
		MECH	Verify CxA qualifications
		MECH	HVAC & controls, domestic water heating system, special system (see LEED Reference Guide) commissioning
		ELEC	Interior & exterior lighting controls, special system (see LEED Reference Guide) commissioning
EAPR2	Minimum Energy Performance (PREREQUISITE)	MECH	Mech contribution, coordinate with other disciplines
		ELEC	Elec contribution to compliance
		ARCH	Building envelope contribution to compliance
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	MECH	
EA1	Optimize Energy Performance	MECH	Mech contribution, coordinate with other disciplines
		ELEC	Elec contribution to compliance
		ARCH	Building envelope contribution to compliance

AE Contract Guidance

- Require compliance with USACE Army LEED Implementation Guide
  - Covers Planning charettes, Code 3/Parametric estimate preparation, RFP preparation, full design
- Must supplement with specific instructions for each project
  - Air Force project guidance (special scoring requirements for industrial, infrastructure & utilities projects)
  - USGBC Registration, Certification guidance if applicable
  - Construction phase services
  - Special credit-related services if applicable (enhanced commissioning, credits with post-occupancy activities)

SAS: Design Manual plus Specific Instructions by Design Branch – must coordinate with PM to write Specific Instructions

Pre-design and Design Phase Technical Reviews

- Reviews follow formalized division of responsibilities by discipline for LEED credits
- Cost Engineer reviews parametric estimate & Sustainable Cost Template if needed
- Each reviewer consults District SDD POC for assistance as needed

In-House Design

- Same as technical review responsibilities but
- Must have a LEED AP on team
  - Assists each discipline in their responsibilities
  - Ensures correct interpretation of LEED credits
  - Coordinates team for materials credits with designer implementation strategies (always for salvage, rapidly renewable, others by PDT choice)
  - Ensures LEED design phase supporting documentation is correct and complete

SAS: LEED AP takes on general topics that were assigned to architect for technical reviews

District Decisions

- How to assign technical responsibilities
- How to accomplish commissioning activities
- When to require registration
- Who will register and administer registered projects
- COS who will register and administer standard designs
- Who will coordinate USGBC certifications if required

District SDD POC

- Disseminates information
- Provides policy/criteria interpretation
- Provides consulting/assistance as requested
- Supports management in developing local policy and procedures for execution

Each USACE District and Center is required to have at least one LEED-AP on staff.

Responsible for correct interpretation of LEED, information dissemination and assistance to PDTs and management

Becoming A LEED Accredited Professional (LEED AP)

- Study LEED Reference Guide, take 2 hour test
- USGBC also offers workshops
- All multiple choice questions
- Local testing centers (Prometric)
- Costs $300 to take test, Government can reimburse you if you pass (similar to professional registration testing – coordinate with supervisor beforehand)

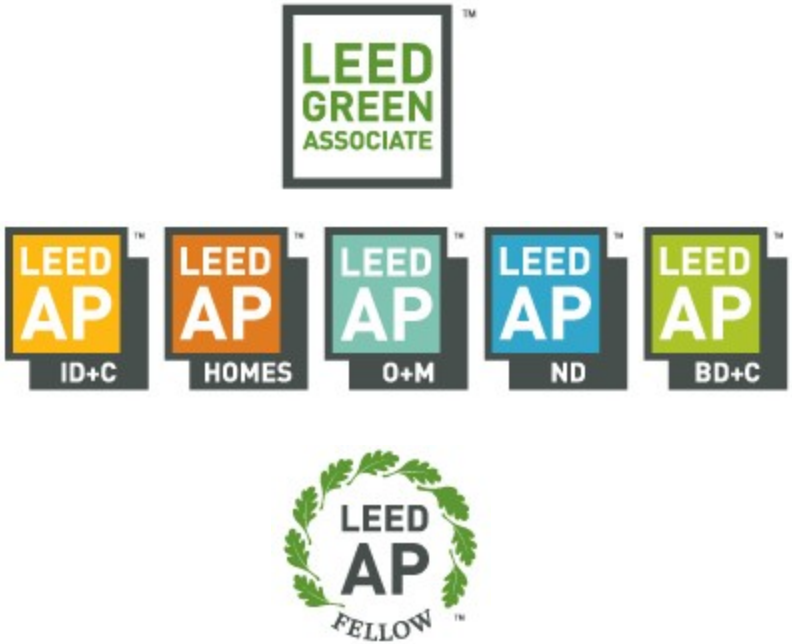
Major changes to LEED AP requirements Spring 09

Changes to LEED AP Program Spring 09

- 3-Tier Credentialing System
  - Green Associate (test)
  - Rating tool-specific AP (rating tool-specific test) can be a LEED AP for multiple rating tools
  - Fellow (exceptional contribution)
    - Legacy AP (inactive status)
- Biannual fee ($50) Coordinate with your mgt for reimbursement policy
- Biannual Continuing Education Requirement (30 hrs, 6 LEED-specific)
- APs need to show project experience for credential maintenance
- Existing LEED APs may opt-in for limited time; retain LEED AP status without testing
- Credentialing Program managed by Green Building Certification Institute (GBCI)

Changes to LEED AP Program

LEED Credentialing Program



Opt-in if you are currently a LEED AP! *Go to gbci.org for info.*

Resources

- USACE LEED Implementation Guide (Feb 09 update)
  - Appendix A contains detailed references section including federal mandates, policies and criteria, USGBC, USACE and other resources and tools.
- District SDD Point of Contact
- HQUSACE SDD Technical Proponent is Joanne Qualey. Rich Schneider and Annette Stumpf at ERDC and Judy Milton at SAS provide technical support as USACE SDD Center of Expertise.

You are a member of USGBC (Army membership)! See Implementation Guide Appendix A for info on member resources

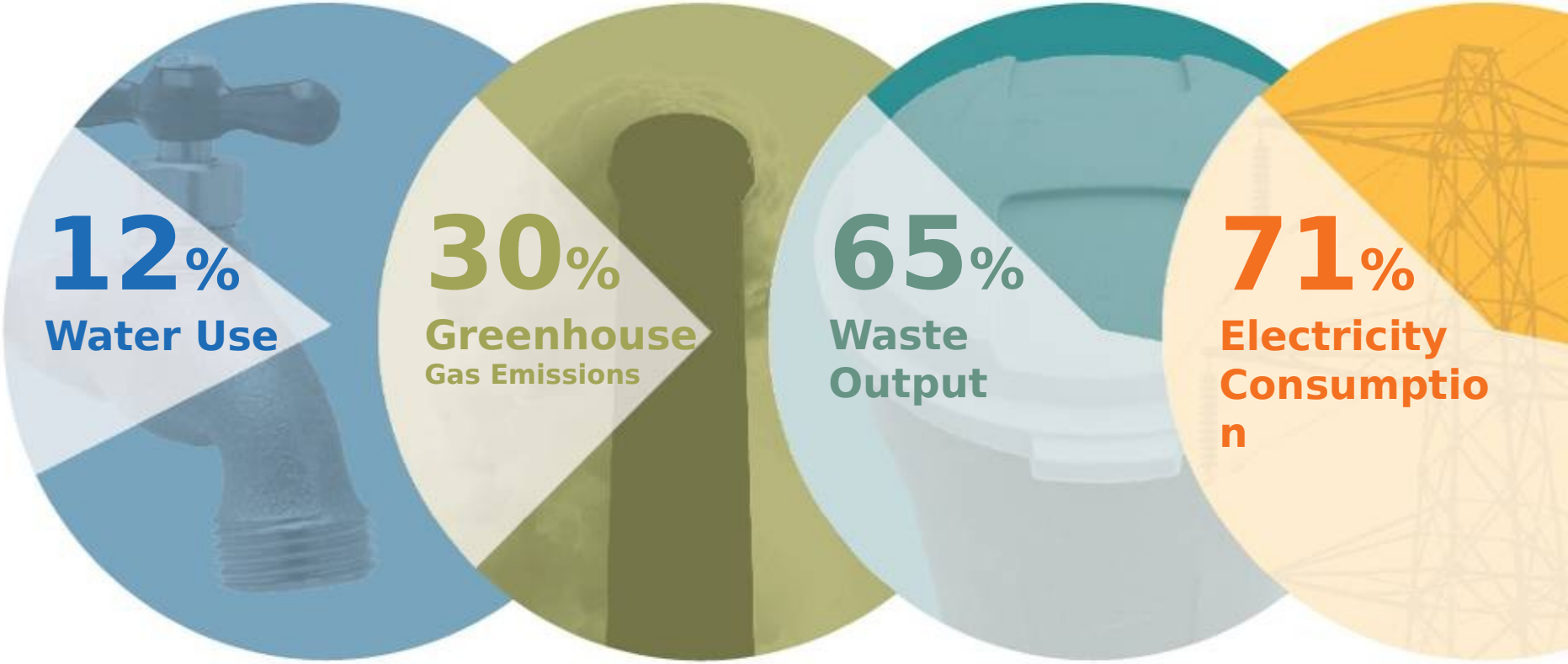
Questions, Feedback

- Requirements
- Exemptions, Other Mandates
- Failure, Waivers
- LEED, LEED Scoring
- MT, COS
- Validation
- Documentation, LEED Letter Templates
- USGBC Registration, Administration
- Reporting
- Responsibilities and Decisions
- LEED AP
- Resources

The LEED-NC Credits

Appendix A of USACE LEED Implementation Guide contains credit-by credit commentary including Army preferences and Installation support roles

U.S. Building Impacts:



LEED-NC Categories

- Sustainable Sites 14 pts
- Water Efficiency 5 pts
- Energy and Atmosphere 17 pts
- Materials and Resources 13 pts
- Indoor Environmental Quality 15 pts
- Innovation & Design Process 5 pts

Prerequisites (7ea): must always do, no points for it.
Credits and Points: some credits are worth one point, other credits have multiple possible points within the credit.
Total score is number of points earned (Silver = min 33 points)

LEED 2009 – What Changes

- From 69 possible points to 100 possible points – re-weighting of existing credits to incentivize climatic priorities
- Minor revisions to some credits to align requirements between the different rating tools (supports crossover between rating tools)
- Region-specific Innovation credits – extra innovation point for earning credits that have regional priority credit
- Still 6 Categories
- Still wide range, some points mutually exclusive
- Still 4EA achievement levels: Certified, Silver, Gold, Platinum, based on number of points earned.

LEED Interpretation Resources

- LEED-NC Reference Guide Version 2.2
- Errata Sheet for LEED-NC Reference Guide Version 2.2 – free download at usgbc.org – 10/31/07 is most recent. (make sure errata sheet is for correct edition)
- Credit Interpretation Rulings (members area of usgbc.org) posted questions from project teams and answers from USGBC – sorted by credit.
- LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC) – free download at usgbc.org – scoring for campus, multiple building projects
- Innovation & Design Credit Catalog – free download at usgbc.org – catalog of previously

Key to symbols used in this section:

No *Currently seldom pursued*

May *Currently sometimes pursued (ma*

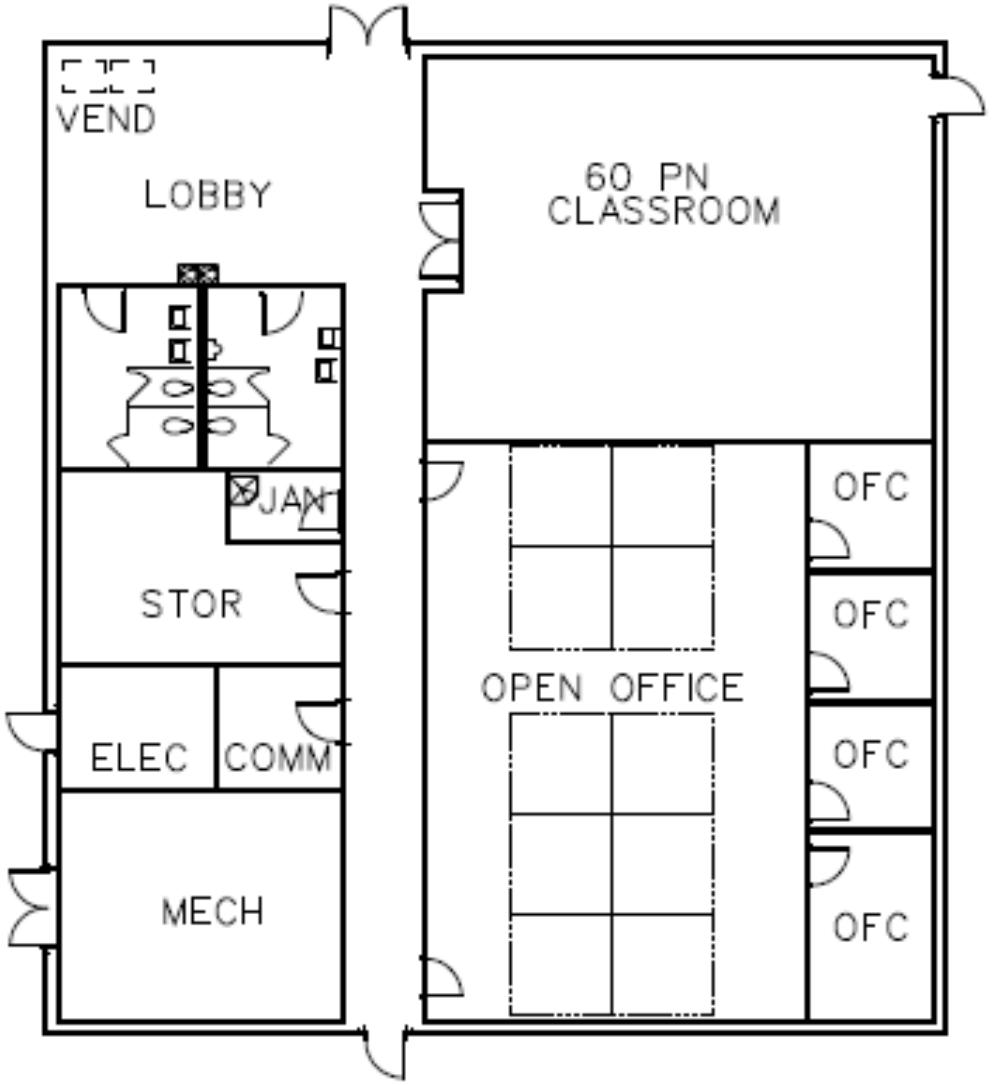
Yes *Currently usually/always pursued*

NOT guidance, commentary on observed strategies to meet LEED Silver

Our Workshop Project

Office/Classroom:

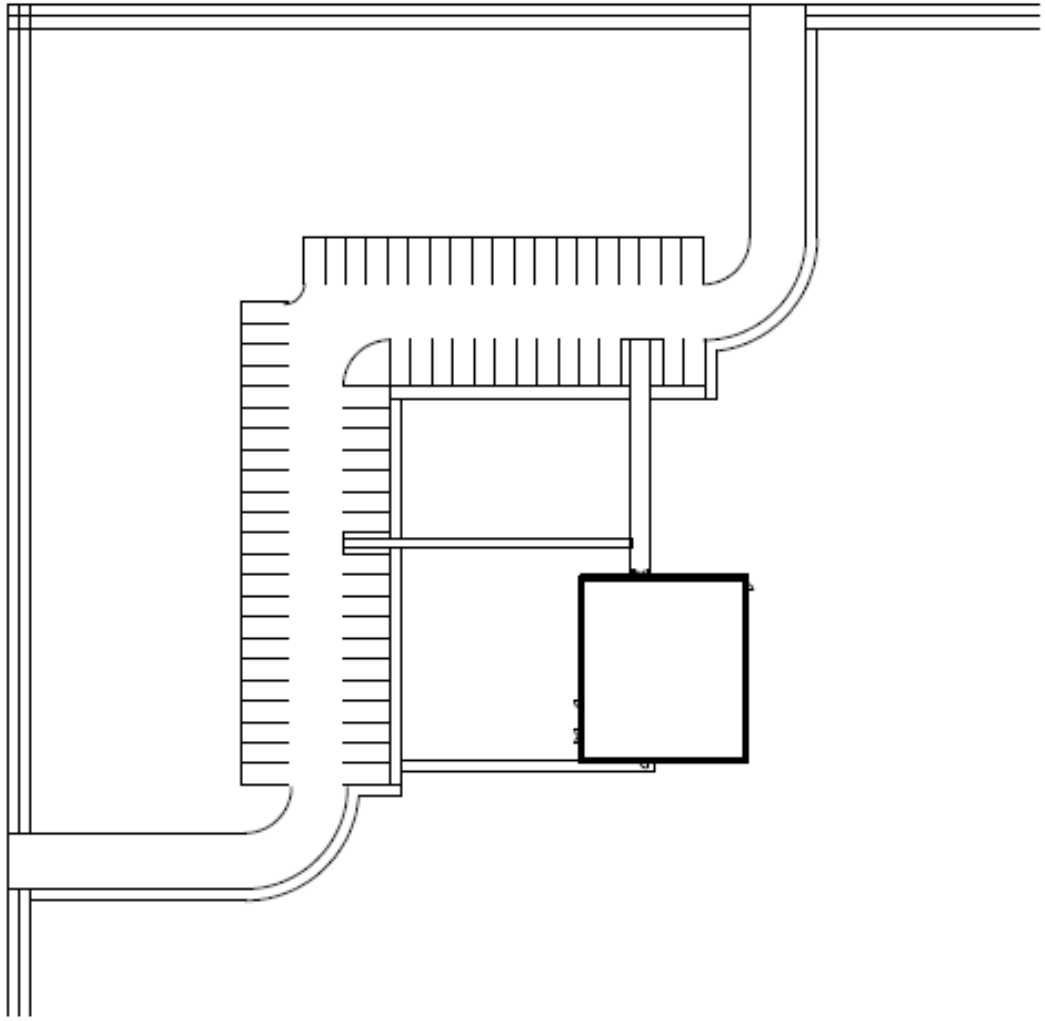
- One story
- 5500 sf
- 14FTEs
- Classroom for 60, 2EA 4-hour classes per work day
- M/F ratio staff 50%
- M/F ratio students 66%M,34%F



Our Workshop Project

Office/Classroom:

- Corner lot
- Previously developed (cleared)
- 100% parking
- Concrete sidewalks at exist roads
- Concrete walks
- Asphalt pavement



Sustainable Sites (SS)

This category covers a wide range of SDD issues, including:

- Appropriate site selection, reducing sprawl
- Supporting alternative transportation
- Preserving habitat & open space
- Erosion & pollution prevention, storm water control
- Reducing heat islands
- Reducing light pollution

1 Prerequisite, 14 possible points

Some are mutually exclusive

All LEED documentation must use the same site boundary!!

Yes

SSPR1: Construction Activity Pollution Prevention Prerequisite

Intent:

Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation

Requirement:

Create and follow an Erosion and Sedimentation Control Plan that meets NPDES, regardless of site size

Notes:

By Contractor

Plan requirements are specified in MT version of UFGS ENVIRONMENTAL PROTECTION

SS Prerequisite 1: Construction Activity Pollution Prevention

Sediment traps are used to collect sediment-laden runoff from disturbed areas on construction sites

Geotextile mats not only protect ground surfaces from wind and storm water erosion but also allow vegetative growth (Source: Rolanka International, 2000)

A Slack Job Here

Way To Go!

May

SS Credit 1: Site Selection

Requirement:

Do not develop portions of sites that are:

- Prime Farmland
- Previously undeveloped and less than 5’ above FEMA 100 yr flood elevation
- Habitat for threatened or endangered species
- Within 100’ of wetlands or areas of special concern
- Previously undeveloped and within 50’ of a body of water
- Previously public parkland prior to acquisition

Notes:

Must answer no to all to take credit

Coordinate with installation on status of site

Can be on the site but can’t be developed part of site

RFPs must convey site status regarding this credit (show limits or state whether earned or not)

No

SS Credit 2: Development Density & Community Connectivity (Option 1)

Intent:

Channel development to urban areas with existing infrastructure, protect greenfields and preserve habitat and natural resources.

Requirement:

Option 1 –previously developed site in an area with minimum 60,000 sf/acre development density (typical of a 2-story downtown development)

Notes:

This density is rare on installations

AT/FP setbacks work against it

May

SS Credit 2: Development Density & Community Connectivity (Option 2)

Requirement:

Option 2 –previously developed site AND within ½ mile of residential zone with minimum 10 units/acre density AND within ½ mile of 10ea Basic Services WITH pedestrian access to all

Notes:

- **½ mile radius is as the crow flies from building main entrance. Multiple buildings: combined area of overlapping circles may be used**
- **Consider UEPH barracks a residential zone (verify density)**
- **Basic Services are listed in LEED – bank, chapel, convenience store, cleaners, fire station, clinic, school, fitness center, restaurant, others**
- **Basic Services are not limited to those listed – apply the credit's intent**
- **Only restaurants can be counted more than once (up to two restaurants)**
- **There has to be sidewalks to all**
- **RFP must convey site's status for this credit (coordinate with**

May

SS Credit 3: Brownfield Development

Intent

Rehabilitate damaged sites where development is complicated by environmental contamination, reducing pressure on undeveloped land.

Requirement:

Develop on a site defined as a brownfield. “Real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant” (EPA)

Notes:

Easy definition: any site requiring remediation (on site, not just part of project)

Remediation may be by others, but must be because of the project

RFP must convey site’s status for this credit (coordinate with installation)

AGMBC: If site is a brownfield, all buildings may take credit even if building is not located on a contaminated portion of site

No

SS Credit 4.1 Alternative Transportation: Public Transportation Access

Requirement (2 Options)

Locate project within ½ mile of an existing or planned and funded commuter light rail or subway station.

OR

Locate project within 1/4 mile of one or more bus stops for 2 or more public or campus bus lines useable by building occupants.

Notes:

Distance is measured by actual pedestrian path from main entrance to stop (not radius)

Must be at least 2 bus routes & both available to occupants

RFP must convey site's status for this credit (coordinate with installation)

Discuss at planning charette – examine mass transit plans and needs, include/program for bus stops and sidewalks if applicable

Yes

SS Credit 4.2 Alternative Transportation: Bicycle Storage & Changing Rooms

Requirement:

For non-residential, provide secure bicycle storage within 200 yards of building entrance for min 5% of peak period building users AND provide shower and changing facilities, in the building or within 200 yards of building entrance, for min 0.5% FTE occupants.

OR

For residential, provide covered storage facilities for securing bicycles for min 15% of building occupants.

Notes:

Proximity to building entrance

Showers may be in another nearby building but must be useable by building occupants (do not count private use shower)

Bike racks are for FTEs PLUS students/visitors etc.

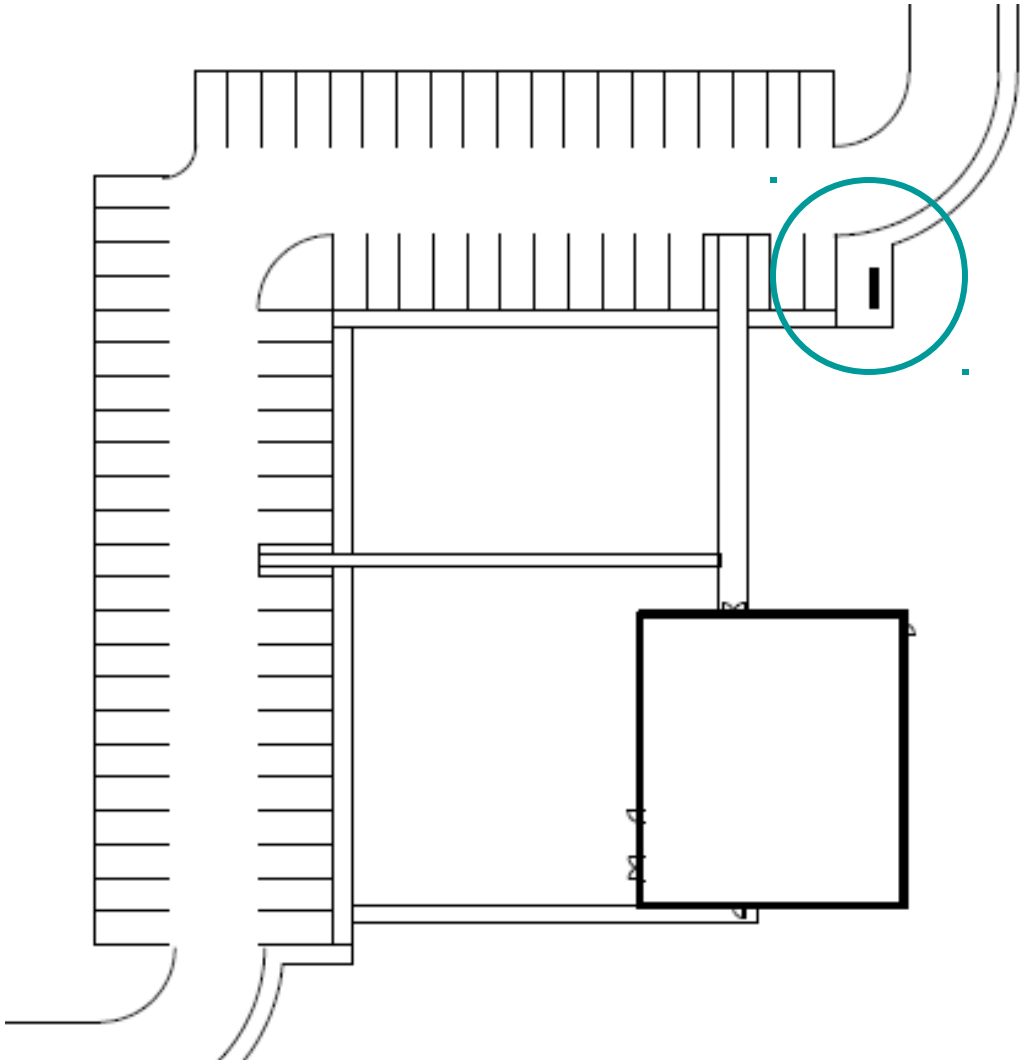
Showers are for FTEs only (0.5%FTE = no. of showers required)

Program/include shelters for bike racks at UEPH barracks!!

SS Credit 4.2 Alternative Transportation: Bicycle Storage & Changing Rooms

Bike storage:

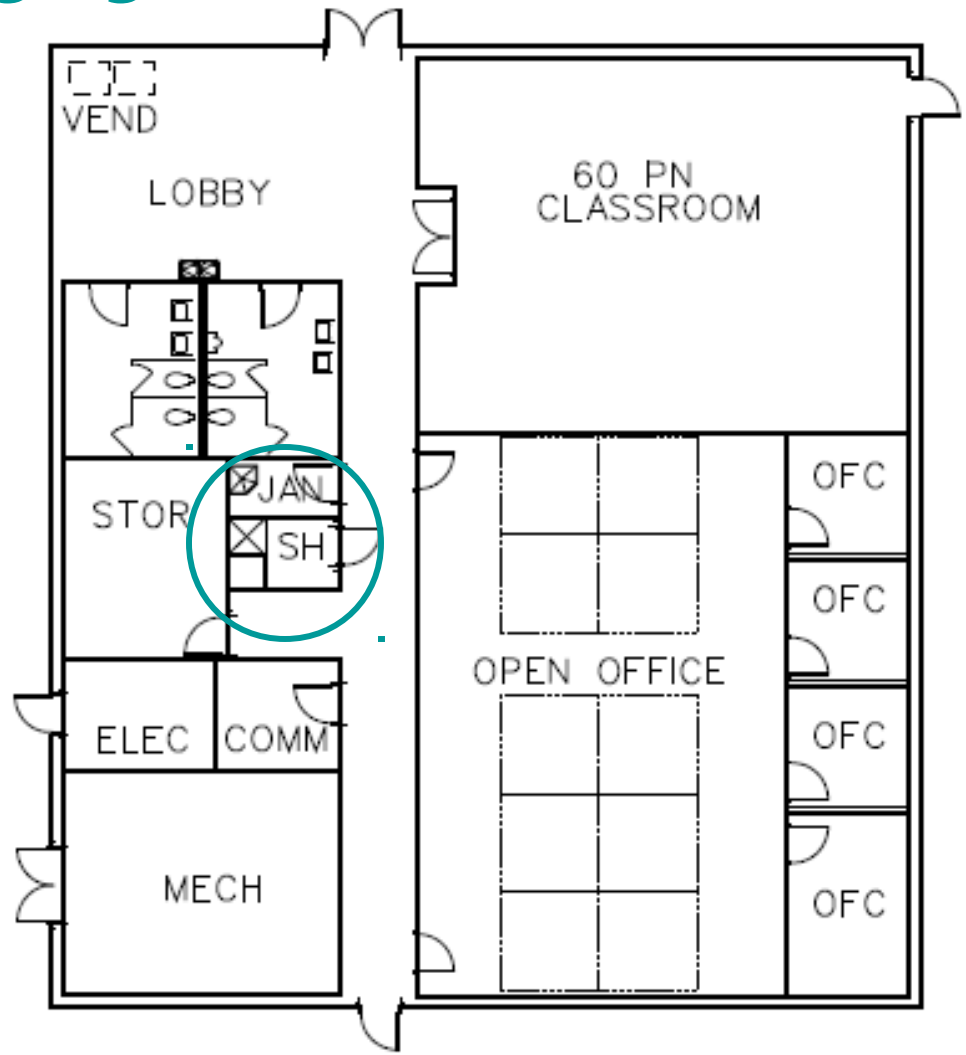
- 60 students
- 14 FTEs
- 74 peak usage
- Rack for 5% peak usage
- 4 bikes



SS Credit 4.2 Alternative Transportation: Bicycle Storage & Changing Rooms

Shower:

- 0.5% FTEs only
- 14FTEs
- 1 shower



Yes

SS Credit 4.3 Alternative Transportation: Low-Emission & Fuel-Efficient (LE/FE) Vehicles

Requirement:

Option 1 – Provide LE/FE vehicles AND preferred parking for them for 3% FTEs

OR

Option 2 – Provide preferred parking for LE/FE vehicles for 5% of total parking capacity

OR

Option 3 – Provide alternative fuel refueling station for 3% of total parking capacity

Notes:

LE/FE vehicles include hybrids, electric

Option 1: Can’t buy vehicles with construction funds

Option 2: Almost Free (signage)!

Option 3: Need to coordinate with installation since they will maintain/provide vehicles

Yes

SS Credit 4.4 Alternative Transportation: Parking Capacity

Requirement:

Option 1 – Nonresidential: Provide parking to meet but not exceed requirement AND make 5% of spaces preferred carpool parking

OR

Option 2 – Nonresidential: Provide parking for less than 5% FTEs AND make 5% of spaces preferred carpool parking

OR

Option 3 – Residential: Provide parking to meet but not exceed requirement AND facilitate shared vehicle use (shuttle/carpool drop off area, ride boards)

OR

Option 4: Provide no new parking

Notes:

Parking requirement is determined by standard design criteria (if none, determined by installation)

“Preferred parking” is close to main entry

All options: Almost Free (signage), easy

Our Project: Signage for 4EA reserved carpool spaces

No

SS Credit 5.1: Site Development: Protect or Restore Habitat

Requirement:

For Greenfield sites, limit site disturbance to 40’ from face of building, 10’ from walkways/parking/utilities under 12” dia, 15’ from primary roads and utilities over 12” dia and 25’ from constructed permeable areas where compaction must be limited (permeable pavement, stormwater detention facilities, playing fields)

OR

For previously developed or graded sites, restore or protect 50% of site (excluding building footprint) with native or adapted vegetation.

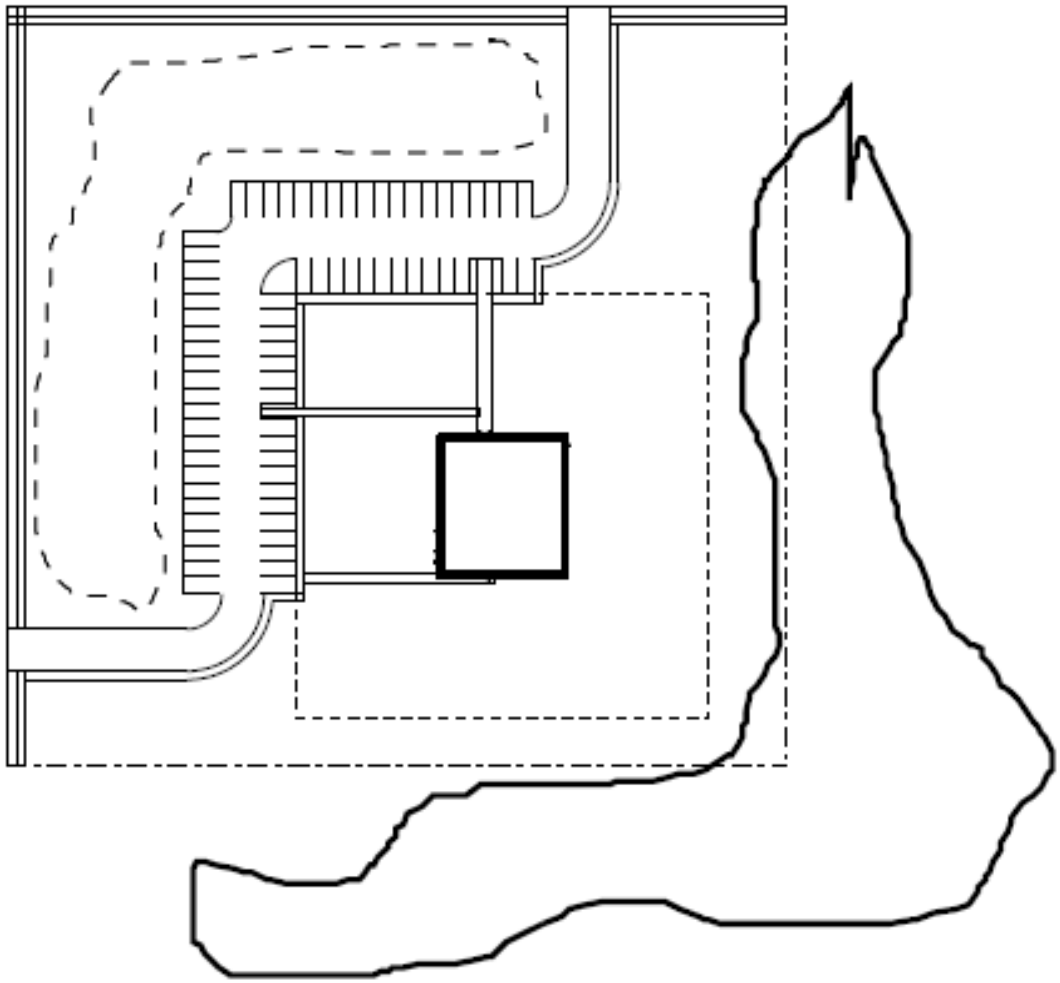
Notes:

- **Greenfield requirements hard, must be coordinated with timber harvest by others**
- **Previously Developed site: Restored area plus protected area = min 50% of site**
- **Only exclude building footprint (not parking)**
- **Native/adapted plants are indigenous to a locality or cultivars of native plants adapted to local climate and not considered invasive or noxious weeds.**
- **Be careful about vegetation types in AT/FP setbacks**
- **Location of site boundary can make or break this point!! Include natural areas in site boundaries (not the same as**

SS Credit 5.1: Site Development: Protect or Restore Habitat

Baseline:

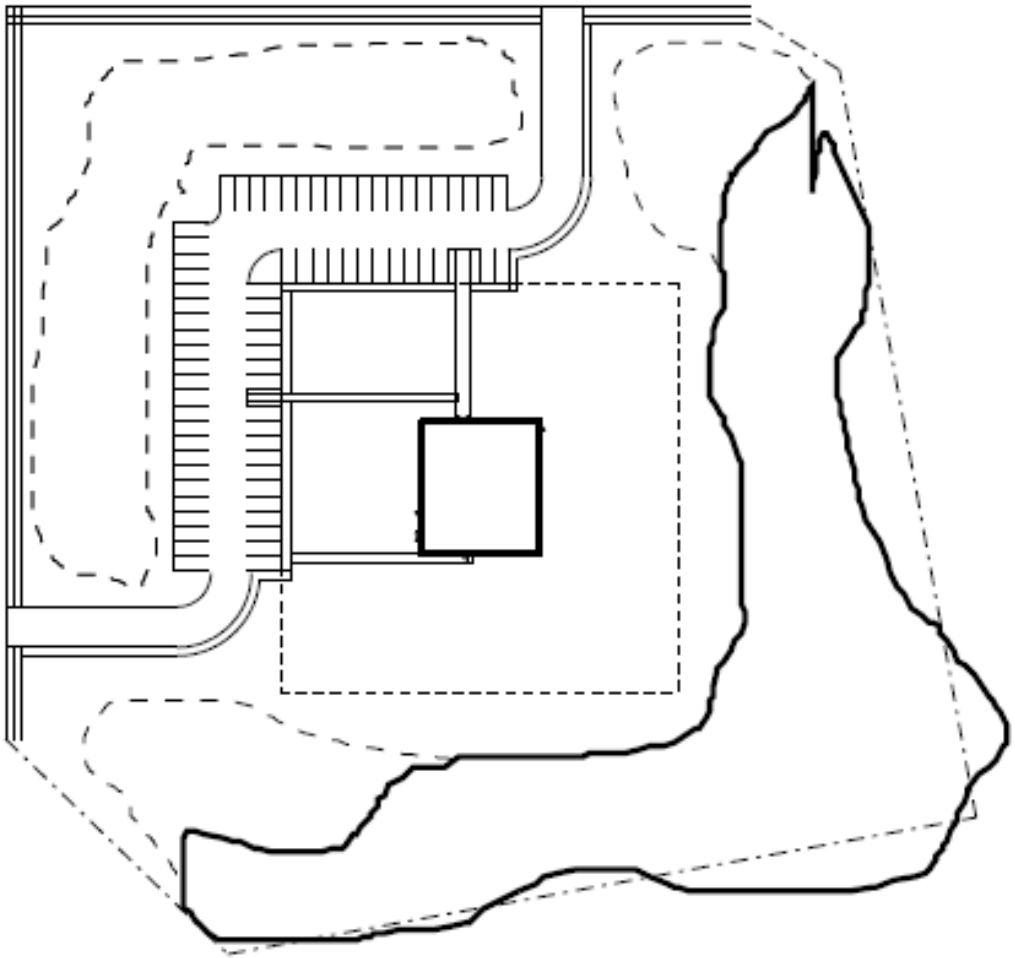
- 191,800sf site area
- Minus 5500sf bldg footprint
- Balance 186,300sf
- Restored/protected habitat required (50%): 93,150sf
- 3700sf existing habitat
- 30,500sf restored habitat
- 58,950sf delta



SS Credit 5.1: Site Development: Protect or Restore Habitat

Revise Site Boundary:

- 274,700sf site area
- Minus 5500sf bldg footprint
- Balance 269,200sf
- Restored/protected habitat required (50%): 134,600sf
- 82,900sf existing habitat
- 52,500sf restored habitat
- (800sf) delta



Future projects must respect this site boundary (no double dipping!)

Yes

SS Credit 5.2 Site Development: Maximize Open Space

Intent:

Provide a high ratio of open space to development footprint to promote biodiversity.

Requirement:

Option 2 (applies to military installation): Provide vegetated open space adjacent to building that is equal in area to building footprint.

Notes:

Free! AT/FP setbacks usually get it

Does not have to be native plants, just vegetated & not paved

AGMBC Alternative: Open space may be at another location on installation. Must be aggregated and contiguous, must be placed in a permanent reserve status and must be in a natural state. Coordinate with installation to establish a “bank” for projects to draw on when needed.

Yes

SS Credit 6.1 Stormwater Design: Quantity Control

Intent:

Limit disruption of natural hydrology by reducing impervious cover, increasing on-site filtration and managing stormwater runoff.

Requirement:

Option 1 – Existing imperviousness less than or equal to 50%: Post-development peak discharge rate and quantity not to exceed pre-development peak discharge rate and quantity for the one-year and two-year, 24-hr design storms.

OR

Stormwater management plan that protects receiving stream channels from excessive erosion (protection strategy and quantity control)

Option 2 - Existing imperviousness greater than 50%: 25% decrease in the volume of stormwater runoff from the two-year, 24-hr design storm.

Notes:

Often required anyway

May

SS Credit 6.1 Stormwater Design: Quality Control

Intent:

Reduce or eliminate water pollution by reducing impervious cover, increasing on-site infiltration and removing pollutants from stormwater runoff.

Requirement:

Capture and treat runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs). Must remove 80% of average annual total suspended solids.

Notes:

On-site stormwater treatment – consider space needed when determining site boundaries, program for structures if needed.

Use Low Impact Development (LID) practices

- Pervious pavement, vegetated swales, constructed wetlands, on-site retention, capture & use stormwater for irrigation or grey water uses

Recharge Garden

Courtesy Cahill & Associates

Bio Swales & Porous

Porous Asphalt

Courtesy Cahill & Associates

Constructed Wetland

Courtesy Cahill & Associates

May

SS Credit 7.1 Heat Island Effect: Non Roof

Intent:

Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Requirement:

Option 1 – Any combination of the following for 50% of the site hardscape (including roads, sidewalks, courtyards and parking):

- **Vegetative shade within 5 years of occupancy**
- **Paving materials with Solar Reflectance Index (SRI) of at least 29**
- **Open grid paving system (must be 50% vegetated voids)**

Option 2 – Minimum 50% of parking spaces underground or under a roof. Roof over parking must have min 29 SRI.

Notes:

PC concrete meets SRI reflectance requirement

Shade is solar noon on summer solstice (direct overhead) – need to estimate 5 yr growth/spread.

Option 1 cannot include shade structures

Open grid paving is grasscrete or similar

Permeable Asphalt

Turfstone

Eco-stone
EcoGrid

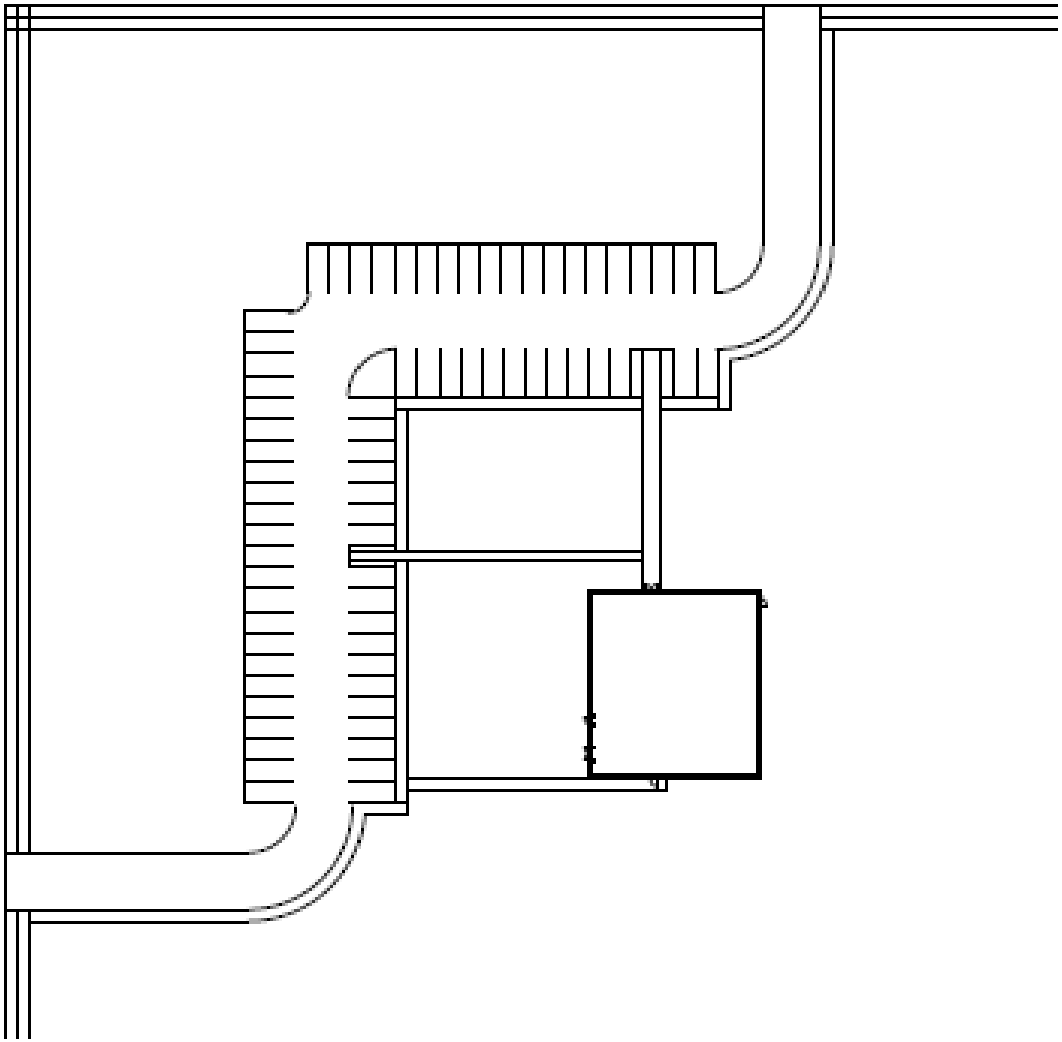
Uni-Lock

Netpave

SS Credit 7.1 Heat Island Effect: Non-Roof

Baseline:

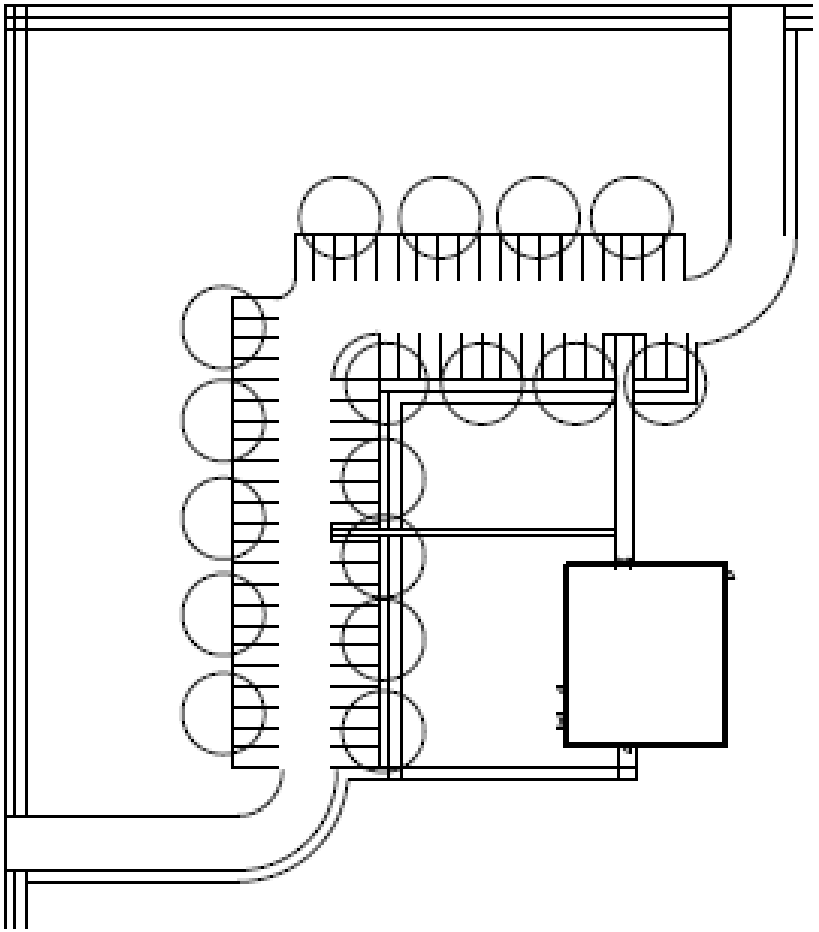
- 7670sf concrete walks
- 26,840sf asphalt parking & drives
- 34,510sf total hardstand
- Reflective/shaded required (50%): 17,255sf
- Reflective/shaded provided (conc): 7670sf
- 9585sf delta



SS Credit 7.1 Heat Island Effect: Non-Roof

Add Vegetative Shading:

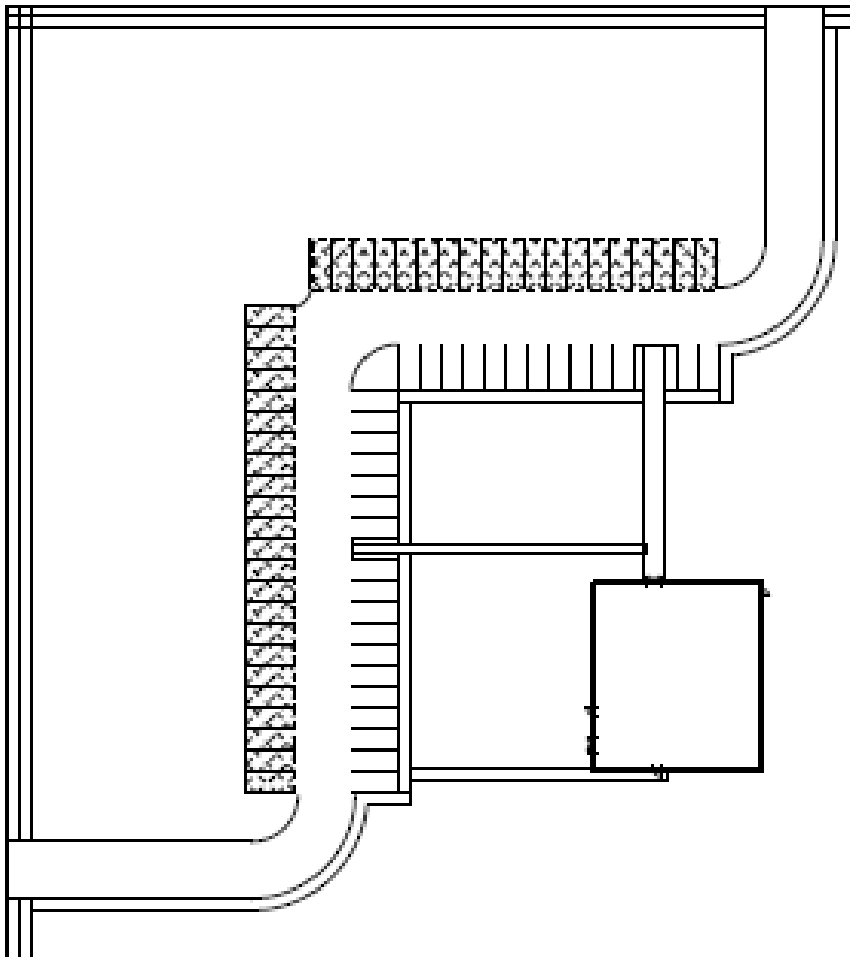
- 17EA 35’dia trees
  - 400sf shade/tree
  - Planting strip between walk & parking
  - $11,000 add
- Reflective/shaded required (50%): 17,255sf
- Concrete walks: 7670sf
- Trees: 6800sf
- 2785sf delta



SS Credit 7.1 Heat Island Effect: Non-Roof

Substitute Open Grid Paving:

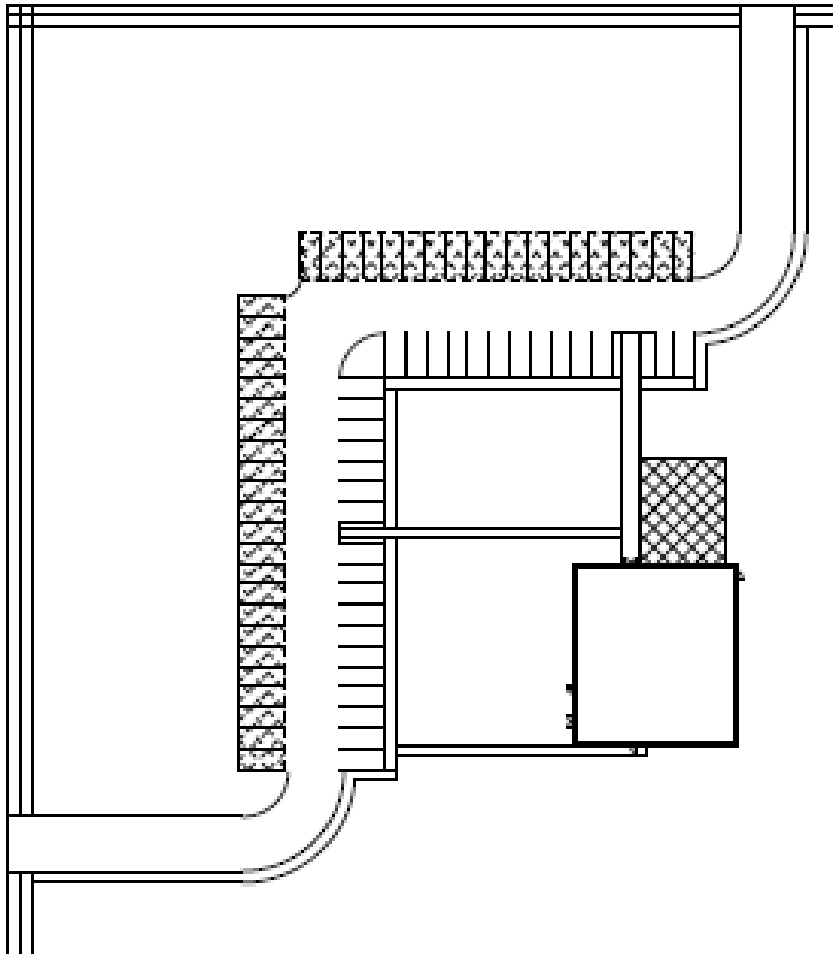
- 7700sf open grid pavement
  - $14,000 add
- Reflective/shaded required (50%): 17,255sf
- Concrete walks: 7670sf
- Open grid pavement: 7700sf
- 1885sf delta



SS Credit 7.1 Heat Island Effect: Non-Roof

Add Concrete Plaza and substitute open grid pavement :

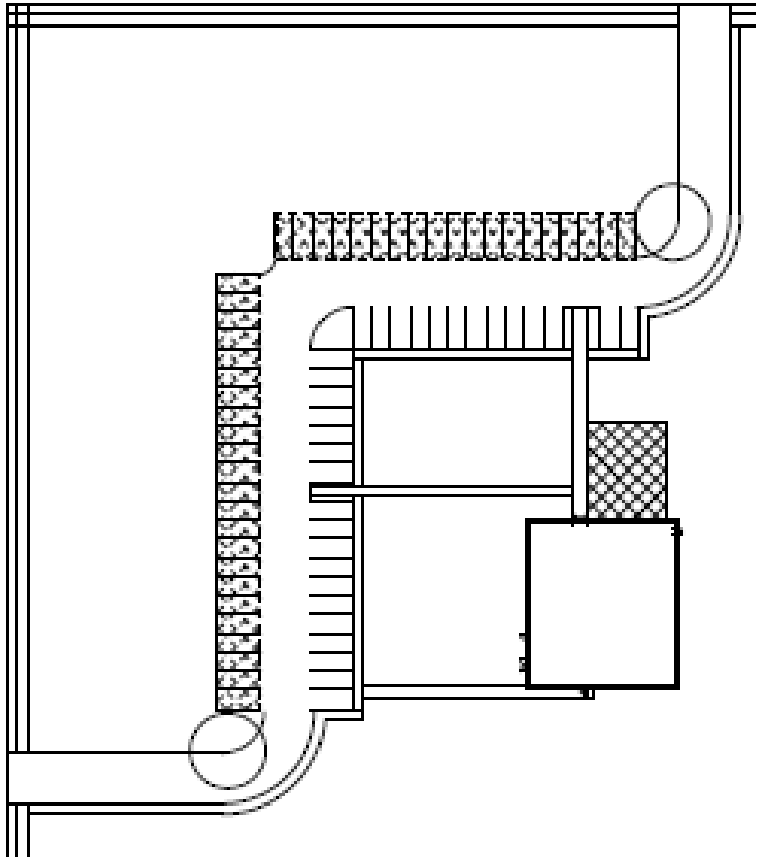
- 7700sf open grid pavement
  - $14,000 add
- 2800sf plaza
  - $10,000 add
- Reflective/shaded required (50%): 18,655sf
- Concrete walks & plaza: 10,470sf
- Open grid pavement: 7700sf
- 485sf delta



SS Credit 7.1 Heat Island Effect: Non-Roof

Add trees, add concrete plaza and substitute open grid pavement :

- 2EA 35'dia trees (400sf shade ea)
  - $1200 add
- 7700sf open grid pavement
  - $14,000 add
- 2800sf plaza
  - $10,000 add
- Reflective/shaded required (50%): 18,655sf
- Concrete walks & plaza: 10,470sf
- Open grid pavement: 7700sf
- Vegetative shading: 800sf
- (315sf) delta



Yes

SS Credit 7.2 Heat Island Effect: Roof

Requirement:

Option 1 – Use roofing materials with min SRI as follows for min 75% of roof area:

- Slope less than 2:12 – SRI 78
- Slope over 2:12 – SRI 29

Option 2 – Minimum 50% of roof area vegetated roof

Option 3 – Combination of Options 1 and 2 above so that (SRI roof area / .75) + (veg roof area / .5) = total roof area

Notes:

SRI is a combination of reflectance and emittance – not the same as Energy Star roof criteria (reflectance only)

Solar Reflectance (albedo) = ability to reflect solar radiation

Emittance = ability to release stored heat

Product info available at Cool Roof Rating Council, www.coolroofs.org

Metal roofs: cool coatings that meet SRI now available in many light and dark colors

Lighter weight vegetated roof systems available, helpful if stormwater management is a problem

HYDROTECH

American Hydrotech, Inc.
phone 800.877.6125
www.hydrotechusa.com

Rediger Associates

(Local Sales Representative)
Rediger Associates
phone 847.695.3299
ronrediger@aol.com

INTRINSIC LANDSCAPING INC.

WHITE PREMIUM ORGANICS

Garden Roof® Assembly

Extensive Design

Vegetation
LiteTop® - Engineered Soil
System Filter SF®
FLORADRAIN® - Retention/Drainage
Moisture Mat SSM45®
STYROFOAM® - Insulation
WSF40® - Root Barrier
HYDROFLEX® - Protection Course
MM6125® - Rubberized Asphalt
Surface Conditioner
Substrate

Saturated Weight 24#-30#/Sq ft
Total Installed Cost* $12-$20/Sq ft
*(roof membrane thru vegetation, cost will vary per project)

Yes

SS Credit 8: Light Pollution Reduction

Requirement:

Interior lighting: angle of maximum candela from each interior luminaire shall intersect opaque building surfaces and not exit through windows.

OR

All non-emergency interior lighting shall be automatically controlled to turn off during non-business hours. Provide manual override for after hours use.

AND

Exterior lighting: Do not exceed 80% of ASHRAE/IESNA 90.1 lighting power densities for exterior areas and 50% of ASHRAE/IESNA 90.1 lighting power densities for building façade and landscape lighting. Follow IESNA RP-33 zone classifications and requirements for the specific zone.

Notes:

IESNA RP-33 deals with illuminance value at site boundary and lumen angle (light trespass).

AGMBC Alternative: Develop campus lighting master plan, accommodating shared lighting. Must still meet credit requirements.

If exterior lighting design is by a privatized utility, their contract must include LEED documentation for their portion of work.

IDG needs to accommodate cutoff fixtures needed to meet credit requirement.

The United States at Night

N O A A
Satellite photo revealing the estimated **30%** of all US outdoor lighting being directed skyward as waste. Conservatively estimated at **$1.5 billion dollars in wasted electricity** yearly, this 30% requires the burning of **6,000,000 tons of coal** each year to generate this electricity waste.
Estimated by the International Dark-Sky Association.

Water Efficiency (WE)

This category covers conservation of fresh water in both site uses (irrigation) and building uses.

5 possible points

All documentation must use the same site boundary!!

Yes

WE Credit 1.1 and 1.2: Water Efficient Landscaping

Requirement:

Credit WE 1.1: Reduce potable water consumption for irrigation by 50%.

Credit WE 1.2: Reduce potable water consumption for irrigation by 100%.

Notes:

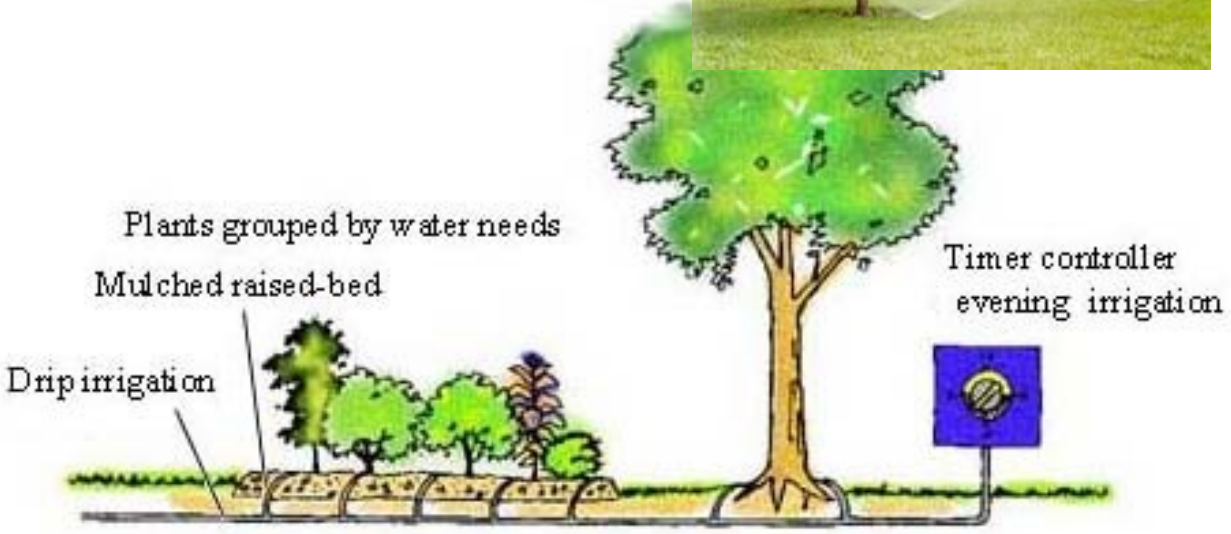
Must use same irrigated area in both baseline and design cases.

Achieve with plant selection, high-efficiency/controlled irrigation system, use of collected stormwater (program the collection structure, pumps, etc)

If temporary irrigation is provided for establishment period, must now be REMOVED at end of establishment period to earn credit (cannot abandon in place).

Projects with no irrigation earn both WE credits 1.1 and 1.2.

Projects with no landscaping are ineligible for these credits



Water-efficient irrigation

May

WE Credit 2: Innovative Wastewater Technologies

Intent:

Reduce generation of wastewater and potable water demand, while increasing the local aquifer discharge.

Requirement:

Option 1 - Reduce potable water use for sewage conveyance by 50% with water conserving fixtures and/or using nonpotable water (graywater, captured rainwater)

OR

Option 2 – Treat 50% of wastewater on-site to tertiary standards. Treated water must be infiltrated or used on-site.

Notes:

High-efficiency fixtures overlaps WE3 Water use reduction credit (check this one if pursuing the other credit).

On-site treatment examples include constructed wetlands, biological reactors (feasible for remote sites)

Yes

WE Credit 3.1 and 3.2: Water Use Reduction

Intent:

Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirement:

WE Credit 3.1 - Reduce building water use by 20% below baseline of EPAct 1992 fixture performance requirements.

WE Credit 3.2 - Reduce building water use by 30% below baseline of EPAct 1992 fixture performance requirements.

Notes:

Calculations include ONLY toilets, urinals, lavatories, showers & sinks (not process water).

High-efficiency fixtures, waterless urinals overlaps WE2 wastewater.

If you make it to 30% you take BOTH credits

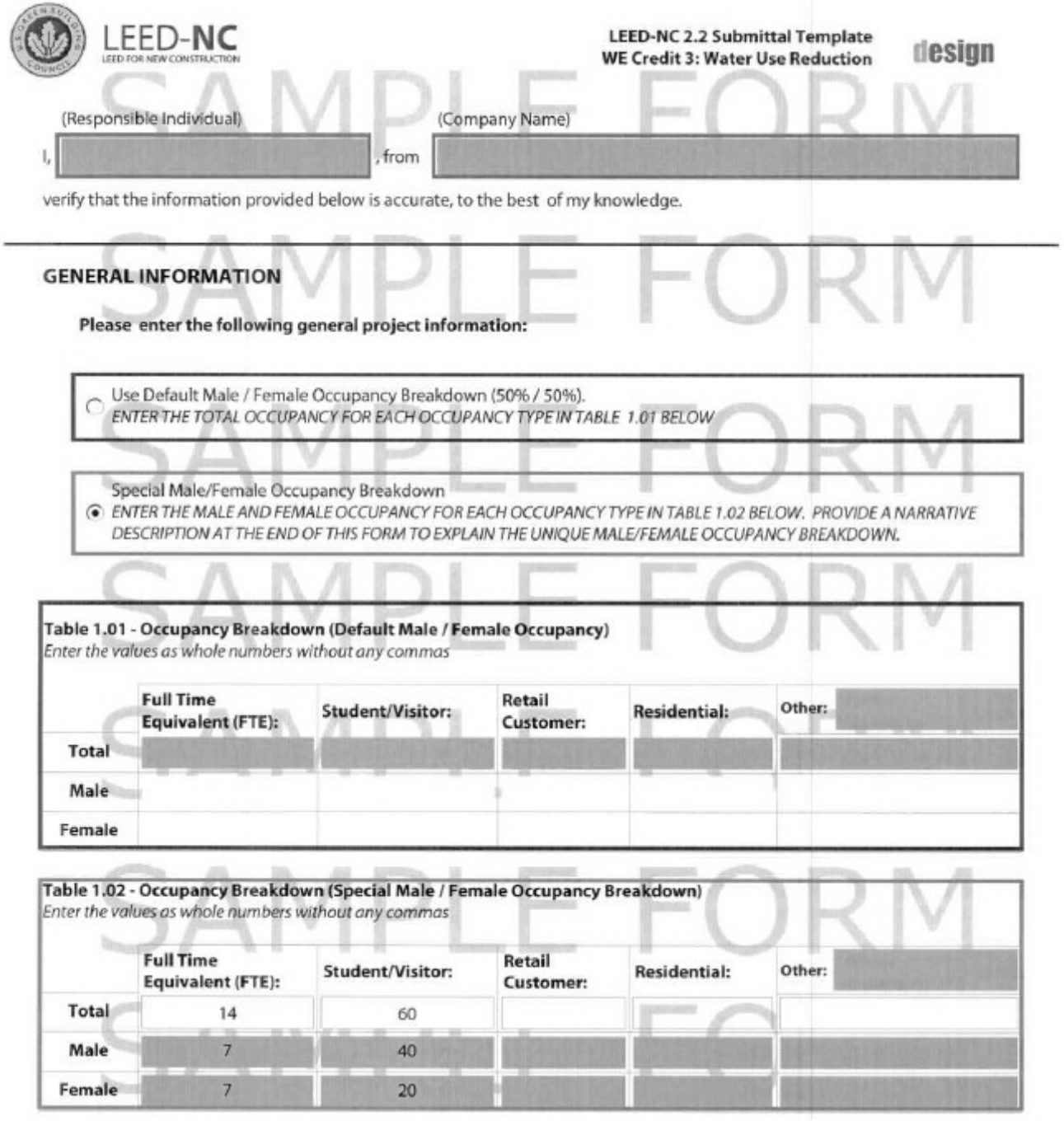
LEED Letter Template does calculations for you!

- Low-flow toilet
- Dual flush toilet
- Pressure assist toil
- Waterless urinal
- Metered faucet
- Sensor faucet
- Low-flow shower

Push-rod automatic faucet controls, reduce water consumption by over 40% and minimize piping redundancies by mixing hot and cold water into single pipe supply lines. (Cambria office building)

WE 3.1 & 3.2: Water Use Reduction

- Enter occupancy breakdown (M/F ratio)
- Select Default (50/50) or Special
- If Default, add totals
- If Special, add M/F actuals



LEED-NC
LEED FOR NEW CONSTRUCTION

LEED-NC 2.2 Submittal Template
WE Credit 3: Water Use Reduction

design

(Responsible Individual) I, _____, from (Company Name) _____

verify that the information provided below is accurate, to the best of my knowledge.

SAMPLE FORM

GENERAL INFORMATION

Please enter the following general project information:

○ Use Default Male / Female Occupancy Breakdown (50% / 50%).
ENTER THE TOTAL OCCUPANCY FOR EACH OCCUPANCY TYPE IN TABLE 1.01 BELOW

◉ Special Male/Female Occupancy Breakdown
ENTER THE MALE AND FEMALE OCCUPANCY FOR EACH OCCUPANCY TYPE IN TABLE 1.02 BELOW. PROVIDE A NARRATIVE DESCRIPTION AT THE END OF THIS FORM TO EXPLAIN THE UNIQUE MALE/FEMALE OCCUPANCY BREAKDOWN.

Table 1.01 - Occupancy Breakdown (Default Male / Female Occupancy)
Enter the values as whole numbers without any commas

	Full Time Equivalent (FTE):	Student/Visitor:	Retail Customer:	Residential:	Other:
Total					
Male					
Female					

Table 1.02 - Occupancy Breakdown (Special Male / Female Occupancy Breakdown)
Enter the values as whole numbers without any commas

	Full Time Equivalent (FTE):	Student/Visitor:	Retail Customer:	Residential:	Other:
Total	14	60			
Male	7	40			
Female	7	20			

WE 3.1 & 3.2: Water Use Reduction

- Revise defaults for urinals, days of operation if needed

Table 1.02 - Occupancy Breakdown (Special Male / Female Occupancy Breakdown)

Enter the values as whole numbers without any commas

	Full Time Equivalent (FTE):	Student/Visitor:	Retail Customer:	Residential:	Other:
Total	14	60			
Male	7	40			
Female	7	20			

Percent of male restrooms with urinals:	100	%
Annual Days of Operation (1-365):	250	

SAMPLE FORM

WE 3.1 & 3.2: Water Use Reduction

Table 1.1 - Flush Fixture Data - Baseline Case

Fixture Reference	Baseline Fixture Type	Gender	Flush Rate (GPF)	Daily Uses Per Person: FTE	Student / Visitor	Retail Customer	Residential		Included in Project?
1	Conventional Water Closet	Female	1.6	3.0	0.5				☒
2	Conventional Water Closet	Male	1.6	1.0	0.1				☒
3	Conventional Urinal	Male	1.0	2.0	0.4				☒

Annual Baseline Flush Fixture Water Usage: 33,900 gallons/year

Baseline Case (flush fixtures, flow fixtures):

- Deselect fixtures you don't have
- Template calculates water usage automatically

Table 1.2 - Flow Fixture Data - Baseline Case

Fixture Reference	Baseline Fixture Type	Flow Rate (GPM)	Duration (seconds)	Daily Uses Per Person: FTE	Student / Visitor	Retail Customer	Residential		Included in Project?
A	Conventional Lavatory	2.5	15	3.0	0.5				☒
B	Conventional Shower	2.5	300	0.1					☒
C	Kitchen Sink	2.5	15						☐
D	Janitor Sink	2.5	15	0.1					☒
E									☐

TOTAL ANNUAL BASELINE WATER USAGE: 40,143 gallons/year

Annual Baseline Flow Fixture Water Usage: 15,843 gallons/year

WE 3.1 & 3.2: Water Use Reduction

Table 2.1 - Flush Fixture Data - Design Case

Fixture Reference	Design Case Fixture Type	Gender	Fixture Manufacturer	Fixture Model	Flush Rate (GPF)	Percent of Occupants	Daily Uses Per Person: FTE	Daily Uses Per Person: Student / Visitor	Daily Uses Per Person: Retail Customer	Daily Uses Per Person: Residential
1	Conventional Water Closet	Female			1.6	100 %	3.0	0.5		
2	Conventional Water Closet	Male			1.6	100 %	1.0	0.1		
3	Non-Water Urinal	Male			0.0	100 %	2.0	0.4		
						%				
						%				
						%				

Annual Design Case Flush Fixture Water Usage: 16,800 gallons/year

Design Cas (flush):

Use pull-down menus to select fixture types (dual flush, low flow, waterless

Template calculates water usage automatically

Our project: We'll try just waterless urinal **(FY10 Army mandated)**

WE 3.1 & 3.2: Water Use Reduction

Design Case (flow):

Use pull-down menus for fixture types

Template calculates water usage automatically

Our project: We'll try low flow lavatory & low flow shower

Table 2.2 - Flow Fixture Data - Design Case

Fixture Reference	Design Case Fixture Type	Fixture Manufacturer	Fixture Model	Flow Rate (GPF)	Percent of Occupants	Duration (seconds)	Daily Uses Per Person: FTE	Student / Visitor	Retail Customer	Residential
A	Low-Flow Lavatory			1.8	100 %	15	3.0	0.5		
B	Low-Flow Shower			1.8	100 %	300	0.1			
C					100 %	15				
D					100 %	15	0.1			
					%					
					%					
					%					
					%					

Annual Design Case Flow Fixture Water Usage:	11,250	gallons/year
Annual Design Case Flush and Flow Fixture Water Usage:	28,050	gallons/year

SAMPLE FORM

WE 3.1 & 3.2: Water Use Reduction

WATER USE SUMMARY

Baseline Case - Annual Water Consumption (gal):	40,143	gallons/year
Design Case - Annual Water Consumption (gal):	28,050	gallons/year
Total Annual Non-Potable Water Consumption (gal):		gallons/year
Total Water Savings:	30.1	%

For credit compliance, a water savings of at least 20% earns 1 LEED point, and a water savings of at least 30% earns 2 LEED points.

- Fill in section on non-potable water use if applicable (not shown)
- Template calculates water usage and % reduction automatically
- Use template as a design tool
- **Our project:** waterless urinals, low flow lavatories and low flow shower get us both points!

Energy and Atmosphere (EA)

This category addresses reducing the amount of energy a building consumes and using more benign forms of energy.

3 Prerequisites, 17 possible points

2 points are mandatory

Yes

EAPR1: Fundamental Commissioning Prerequisite

Intent:

Verify that the building's energy-related systems are installed, calibrated and perform according to the owner's project requirements, basis of design, and construction documents.

Requirement:

Must commission as a minimum all HVAC & controls, lighting controls, domestic water heating, other energy related systems provided – include in contract requirements.

Qualified Commissioning Authority (CxA) - documented experience 2 projects

Owner's Project Requirements document (OPR) – by RFP preparer/designer.

Basis of Design document (BOD) – by Designer of Record.

Commissioning Plan – by design team with CxA

Commissioning Report – by CxA at closeout

Notes:

CxA can change during course of project, may be employee of/hired by designer or construction contractor, may only be member of design/construction team if <50,000sf

USACE templates available for OPR, BOD, Commissioning Plan

Yes

EAPR2: Minimum Energy Performance Prerequisite

Intent:

Establish the minimum level of energy efficiency for the building.

Requirement:

Comply with mandatory provisions of ASHRAE 90.1-2004 (without amendments)

AND

Comply with the prescriptive or performance requirements of ASHRAE 90.1-2004 (without amendments)

Notes:

Our criteria before EPAct 2005 – we have to exceed this now

Yes

EAPR3: Fundamental Refrigerant Management Prerequisite

Intent:

Reduce ozone depletion.

Requirement:

New Building HVAC systems: Zero use of CFC-based refrigerants.

Existing Buildings re-using existing HVAC systems: Complete a comprehensive CFC phase-out conversion prior to project completion.

Yes

EA Credit 1: Optimize Energy Performance

Requirement:

Option 1 – Whole Building Energy Simulation

Earn up to 10 points based on percent energy cost savings over baseline building

MINIMUM 2 POINTS ARE NOW LEED MANDATORY (14% reduction new building, 7% reduction existing building)

(Option 2 - Prescriptive compliance Path for Office buildings under 20,000 sf only – not applicable)

(Option 3 – Prescriptive Compliance Path with Advanced Buildings Benchmark Version 1.1 – not applicable)

Notes:

Army MT projects must earn points associated with EPACT compliance.

EPACT is energy USE reduction vs LEED is energy COST reduction

EPACT calcs exclude process loads vs LEED includes them

MT CERL Technology Solution Sets for EPACT: CERL adding summary data to technology solution sets, will provide partially completed Letter Template if USGBC certified project (minus utility cost). *Contact Dale Herron if you need it.*

This is not just mechanical – need envelope, lighting contributi

No

EA Credit 2: On-Site Renewable Energy

Requirement:

Use on-site renewable energy systems to offset building energy cost.

- 2.5% of building energy renewable = 1 point
- 7.5% of building energy renewable = 2 points
- 12.5% of building energy renewable = 3 points

Notes:

On-site power generation from wind, solar, water, geothermal OR to offset space-heating, space-cooling, water heating energy consumption.

ELIGIBLE: Photovoltaic, wind, hydro for power, geothermal systems that use deep-earth water or steam for power or thermal energy, active solar system for thermal energy.

NOT ELIGIBLE FOR THIS CREDIT: passive solar, daylighting, geo-thermal or ground source heat pumps (count under EA1)

EPAct includes renewable energy milestones (7.5% by 2013) – coordinate with Installation Energy Manager –

Photovoltaics

Certain materials can convert sunlight into electricity (semiconductor)

"Solar cells", "PV systems"

Today's systems convert 7% to 17% of sunlight into electricity ("conversion efficiency")

Consumes no fuel, produces no pollution, silent (no moving parts)

Highly reliable, last 20 years or longer, little maintenance

Orient to maximize sunlight capture

Largest current market is rural/developing areas: One 50Wp module= 5 fluorescent bulbs, radio, 15"b/w TV for 5 hrs/day

- **Also water pumping, remote industrial applications**
- **Remote site, small power, outdoor lighting, residential power**

The sun's energy that strikes the earth in one minute exceeds the total amount of energy consumed by all the world's people in one year!!

Photovoltaics

Modular: Cells, modules, arrays (add or move modules)

PV modules are rated by Peak Wattage (Wp)

PV modules cost around $6 per watt ($10 to $15 w/ battery, inverter, etc), produce electricity for as little as 25 to 50 cents per kWh

Uses:

- **Direct use of DC power generated (pumps, fans)**
- **With battery storage (DC or AC with inverter – lights, sensors, recording equipment)**
- **With backup generator power (constant power requirement, larger requirement)**
- **Connected to local utility (utility provides backup power, excess fed back to grid)**

Other Forms:

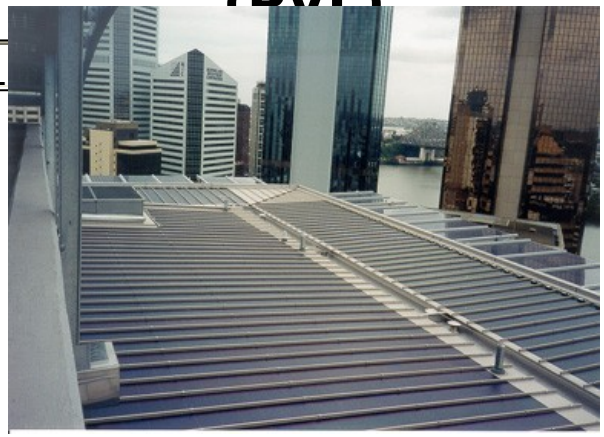
- **Roof shingles**
- **Metal roof panels (building-integrated)**
- **Coatings**

Rapidly expanding global market!!

Worldwide production 6.5MW in 1980, 126.7MW in 1997

Photovoltaics

Field Applied Roofing Laminate (PVL)



Brisbane, Australia
30 kW of UNI-SOLAR® PVL bonded on BHP Color Bond

Standing Seam Metal Systems (SSR)

Santa Monica, CA, SolarPort generates 44,000kW/hours of electricity from the sun each year

Standard Rigid Module With Durable Frame

Roehamption-Vale, United Kingdom
10.5 kW system using rack-mounted US-64s

Wind Power

- Home-sized: rotors 8 to 25 ft dia, ~ 30 ft tall
- Largest utility: rotors > 300 ft dia, > 200 ft tall

Drawbacks:

- Noise, aesthetics, bird kills
- Intermittent wind
- Good sites in remote locations
- Competition with other land uses

Courtesy NREL

Fastest growing electricity source in 1990s.

No

EA Credit 3: Enhanced Commissioning

Intent:

Begin the commissioning process early in the design process and execute additional activities after systems performance verification is completed.

Requirement:

Fundamental Commissioning requirements PLUS

CxA design review with backcheck

CxA contractor submittals review

Systems Manual

CxA 10-month post-occupancy building operation review, plan for corrections.

CxA MUST answer directly to Owner

Notes:

Only way DB can earn this credit is if Government provides CxA – separate USACE or Installation contract OR, per CIR 9/15/06, Contractor may hire but must be "disinterested 3rd Party" who answers directly to Government not through Contractor.

Post-occupancy activities –LEED score is not final at construction completion (contract closeout issue)

Design Phase through Post-Occupancy – cannot add to

May

EA Credit 4: Enhanced Refrigerant Management

Intent:

Reduce ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to global warming.

Requirement:

Option 1 – Do not use refrigerants.

OR

Option 2 – Select refrigerants and HVAC&R so that

LCGWP + LCODP x 10 to the 5th power does not exceed 100

LCGWP = Lifecycle Direct Global Warming Potential (lbCO2/Ton-Year)

LCODP = Lifecycle Ozone Depletion Potential (lbCFC11/Ton-Year)

AND

No halon, CFC or HCFC fire suppression systems

Notes:

New refrigerants & equipment – often included in tech proposals

Units using less than 0.5lbs refrigerant are not included

No

EA Credit 5: Measurement and Verification

Intent:

Provide for the ongoing accountability of building energy consumption over time.

Requirement:

Develop and implement Measurement & Verification Plan

M&V period no less than one year post-occupancy

Notes:

MT Default (Appendix L) is assume NO post-occupancy activities by Government – revise if not so. ALWAYS confirm this understanding when evaluating technical proposals.

Coordinate with Installation on EMCS capability for post-occupancy implementation.

No

EA Credit 6: Green Power

Intent:

Encourage the development and use of grid-source renewable energy technologies on a net zero pollution basis.

Requirement:

Provide at least 35% of the building's electricity from renewable sources by engaging in at least a two-year renewable energy contract.

Notes:

Requires a green power contract – Installation action.

Coordinate with Installation on applicability

Energy Resources

- CREST Center for Renewable energy & sustainable Technology, Renewable Energy Policy Project - http://solstice.crest.org/index.html
- DOE Smart Communities Network - http://www.sustainable.doe.gov
- DOE EERE (Energy Efficiency & Renewable Energy) Information Center - http://www.eren.doe.gov
- Environmental Building News - http://www.ebuild.com
- Rocky Mountain Institute - http://www.rmi.org
- U. S. Army Engineering Research & Development Center, Construction Engineering Research Laboratory - http://www.cecer.army.mil
- DOE Lawrence Berkeley National Laboratory: The Home Energy Saver - http://hes.lbl.gov/
- National Renewable Energy Laboratory (NREL) - http://www.nrel.gov/
- Sustainable Buildings Industry Council (SBIC): Energy 10 - http://www.sbicouncil.org/
- EPA EnergyStar- http://www.energystar.gov
- NIST Building and Fire Research Laboratory, Moist 3.0 - http://www.bfrl.nist.gov/863/moist.html
- DOE Lawrence Berkeley National Laboratory: Daylighting http://windows.lbl.gov/daylighting/Default.htm
- Green-E Renewable Electricity Certification Program - http://www.green-e.org

Materials and Resources (MR)

This category covers selection of materials and activities that reduce the waste stream, conserve virgin materials and minimize negative environmental effects of materials extraction, manufacture and transport.

1 prerequisite, 13 possible points

All Materials credits except building reuse and construction waste diversion:

- *Calculations are based on cost of division 2-10 materials ONLY (excludes plumbing, mechanical, electrical).*
- *Can include furniture, but if so, must include for ALL MR credits.*
- *All of these credits must use the same project materials total.*
- *LEED allows use of a default materials cost of 45% of project cost*

Yes

MR Prerequisite 1: Storage & Collection of Recyclables

Requirement:

Provide an easily accessible area that serves the entire building and is dedicated to the collection and storage of non-hazardous materials for recycling, including at a minimum:

paper, corrugated cardboard, glass, plastics and metals

Notes:

No minimum size room required – must be suitable (suggested sizes in LEED Reference Guide).

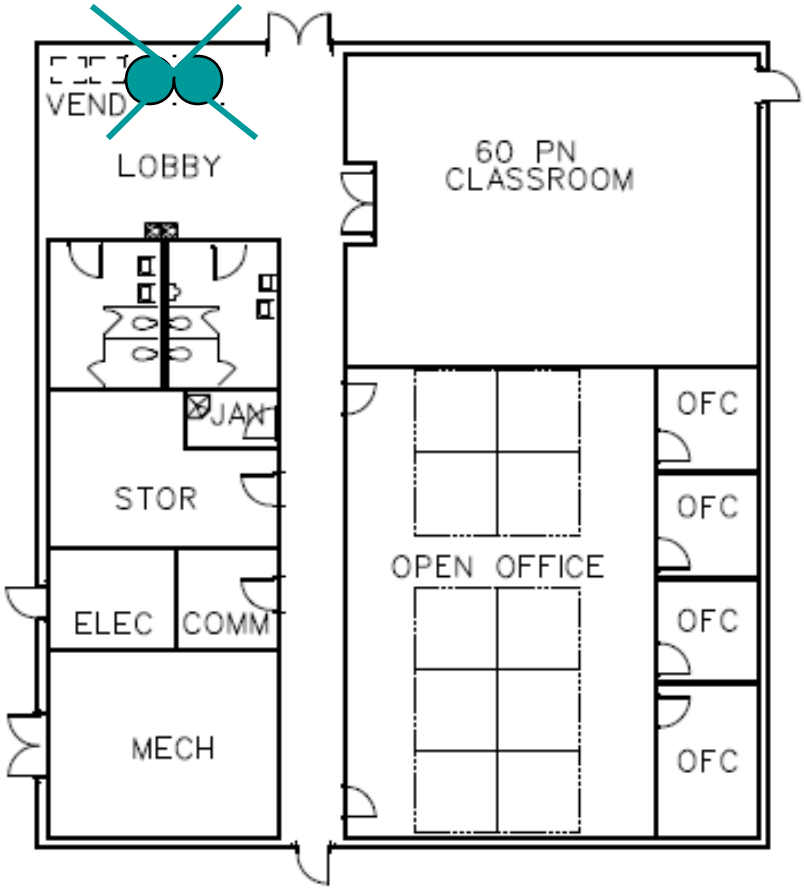
Receptacles in corridors only are not acceptable (corrugated cardboard)

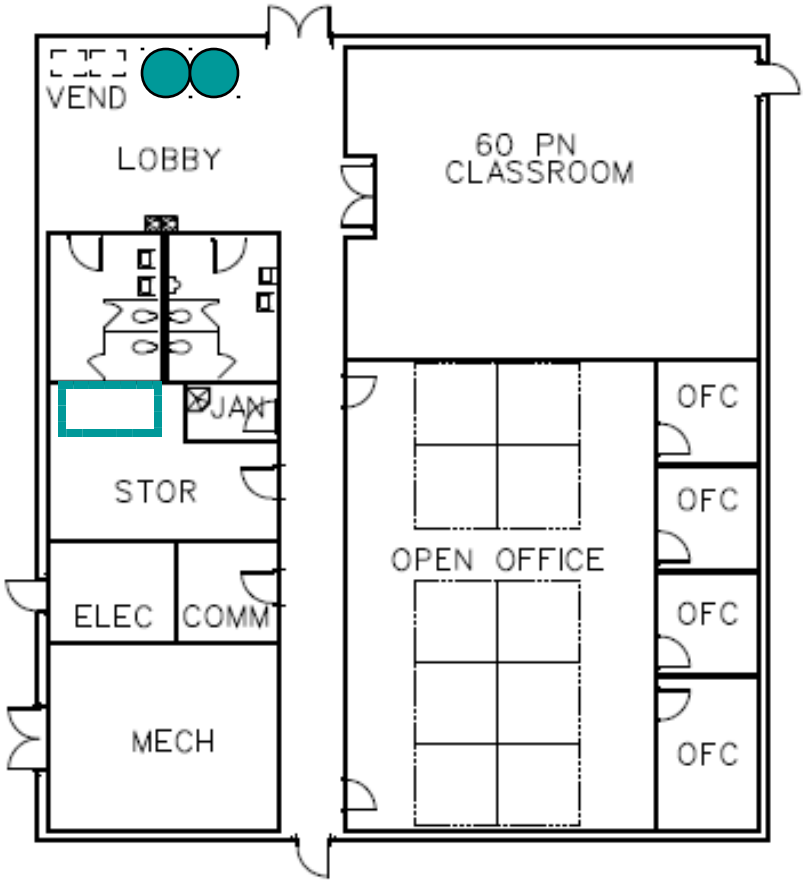
Does not always have to be in the building, can be shared in a complex – can be area at dumpster enclosure for recycling receptacles if functionally appropriate (barracks).

Does not always have to be a separate room (designated area at loading dock/warehouse).

Need to determine if solution is appropriate for building to meet intent

MRPR1: Storage & Collection of Recyclables





No

MR Credits 1.1, 1.2, 1.3: Building Reuse

Requirement:

Credit MR1.1 – Maintain 75% of Existing Walls, Floors and Roof

- Includes structural floor and roof deck, exterior skin and wall structure
- Excludes doors/windows and roof covering

Credit MR1.2 – Maintain 95% of Existing Walls, Floors and Roof

- Same as 1.1 but take BOTH points if 95%.

Credit MR1.3 – Maintain 50% of Interior Non-structural Elements

- Includes partitions, doors, floor coverings, ceilings

Notes:

Percentage of surface area

Renovation and Add/Alt Projects only

If add/alt, CANNOT take these credits if addition area is more than 2x existing building area.

If can’t earn this credit, can count reused elements as diverted waste under MR 2

MR1.1, 1.2, 1.3: Building Reuse

Adaptive reuse of historic structures at Ft. Riley, Kansas

Yes

MR Credits 2.1 & 2.2: Construction Waste Management

Requirement:

Credit MR2.1 – Recycle or divert at least 50% of non-hazardous construction and demolition debris. Develop and implement construction waste management plan.

Credit MR2.2 – Same as 2.1 but take BOTH points if 75%.

Notes:

Army mandates 50% diversion ALL PROJECTS.

LEED allows calculation by weight or volume, Army needs it in weight for it's reporting requirement (in MT wizard).

Army (SWAR) and Air Force need quarterly and final reports with tickets (in MT wizard). Obtain from contractor, forward to installation coordinator.

Waste mgt plan requirements are in MT Environmental Protection Plan spec.

CANNOT include excavated soil and land-clearing debris (vegetation, rocks).

MUST be generated on-site (no source reduction).

CAN include charities, salvagers, recyclers, deconstruction, reuse of materials on-site (rubble, asphalt).

Renovations that don't qualify for MR1 can count reused materials in this credit (not both credits).

Exclude hazardous materials from calculation.

Multiple contractors (COS) - Must combine data from all contractors to determine project total (construction administration).

No

MR Credits 3.1 & 3.2: Materials Reuse

Requirement:

Credit MR3.1 – Use salvaged, refurbished or reused materials so that the sum of these materials constitutes at least 5%, based on cost, of the total value of materials on the project.

Credit MR3.2 – Same as 3.1 but take BOTH points if 10%.

Notes:

This is for incorporating salvage, refurbished materials in new work

- From somewhere else
- “Fixed components” from on-site only if used for a different purpose (use door for a countertop)
- “Finish materials” from on-site w/same use if refurbished (re-used refurbished door hardware)

Retained existing items in the project count under either MR1 Building Reuse or MR2 Waste Mgt (reusing existing on-site fencing in new on-site location is MR2).

Designer responsibility – identify sources and incorporate them into design.

Difficult on DB – quality control.

Yes

MR Credits 4.1 & 4.2: Recycled Content

Requirement

Credit MR4.1 – Use materials with recycled content so that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10%, based on cost, of the total value of materials on the project.

Credit MR4.2 – Same as 3.1 but take BOTH points if 20%.

Notes:

This is for incorporating new materials with recycled content.

Pre-consumer = post-industrial (blast furnace slag)

Can be designer or contractor responsibility (UFGS 01 33 29).

Related to but IN ADDITION TO EPA CPG recycled content mandate requirements.

See LEED Reference Guide for composite/partial calculations.

Building materials heavy contribution to total - Multiple Contractor projects: determine suitable division of

Recycled Content: EPA Comprehensive Procurement Guidelines (CPG)

- Mandatory all federal agencies
- If EPA designates a product, we must buy it with their recommended recycled content unless we have justification for non-use
  - Technically unsuitable
  - Unavailability
  - Prohibitive cost
  - Prohibitive schedule impact
- Contributes to LEED recycled content, but must ALWAYS be done regardless of LEED
- UFGS 01 62 35 RECYCLED/RECOVERED MATERIALS – ALL PROJECTS (DB, DBB versions)
- Example designated products: concrete, rigid and batt insulation, metal roofing

MR Credits 4.1 & 4.2: Recycled Content

Choose actual or default materials cost

SELECT OPTION

Please select the appropriate option to determine the Total Materials Cost

(•) **Default Materials Value:** Based on the total construction costs (hard costs for CSI Master Format 1995 Divisions 2-10 only)

( ) **Actual Materials Value:** Based on actual materials cost (hard costs for CSI Master Format 1995 Divisions 2-10 only)

DEFAULT MATERIALS VALUE

Enter the total construction costs (hard costs for CSI Master Format 1995 Divisions 2-10 only)*	$795,000.00
Default materials cost (total construction cost x 0.45)	**$357,750.00**

SAMPLE FORM SAMPLE FORM SAMPLE FORM

MR Credits 4.1 & 4.2: Recycled Content

- Input materials data
- Start with steel & concrete
- EPA designated items
- Watch % change as items are added, revised (bottom of form)

SAMPLE FORM

Material Name	Manufacturer	Material Cost* ($)	Post-Consumer Recycled Content (%)	Pre-Consumer Recycled Content (%)	Recycled Content Information Source	
Concrete with fly ash		$18,500.00		25.00		CLEAR
Steel Building Frame		$10,000.00	95.00			CLEAR
Light gage steel deck		$9,600.00	35.00			CLEAR
Reinforcing steel		$2,000.00	95.00			CLEAR
Metal Roofing		$24,000.00	35.00			CLEAR
Steel stud walls		$2,300.00	35.00			CLEAR
Metal toilet partitions		$2,000.00	35.00			CLEAR
Rigid Insulation		$18,000.00	9.00			CLEAR
Batt Insulation		$1,800.00	25.00			CLEAR
Ceiling suspension system		$3,700.00	35.00			CLEAR
Carpet		$3,500.00	10.00			CLEAR
Metal siding		$3,600.00	35.00			CLEAR
Split face CMU veneer		$3,300.00	10.00			CLEAR
Alum door & window frames		$3,000.00	80.00			CLEAR
Acoustic Tile ceiling		$5,500.00	25.00			CLEAR

MR Credits 4.1 & 4.2: Recycled Content

Our project:

Pre-engineered steel frame on slab
Steel stud walls
Metal deck, Metal roof
Rigid insulation walls & roof
Steel siding, split-face CMU base
Batt insulation exterior walls & acoustic
Carpet, ceiling tile
Aluminum windows & storefront

Recycled Content Calculations

SAMPLE FORM

Total value ($) of post-consumer content	$33,745.00
Total value ($) of pre-consumer content	$4,625.00
Total combined recycled content value ($): post-consumer + 1/2 pre-consumer	$36,057.50
Combined Recycled Content Value as a percentage of Total Materials Cost**	**10.079** %

SAMPLE FORM

***To qualify for the credit the percentage of recycled content (post-consumer + 1/2 pre-consumer must be at least 10% of the total materials cost*

Yes

MR Credits 5.1 & 5.2: Regional Materials

Intent:

Increase demand for building products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

Requirement:

Credit MR5.1 – Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the projects site for a minimum of 10%, based on cost, of the total value of materials on the project.

Credit MR5.2 – Same as 3.1 but take BOTH points if 20%.

Notes:

ALWAYS contractor responsibility (01 33 29).

See LEED Reference Guide for composite/partial calculations.

Site materials heavy contribution to total - Multiple Contractor projects: determine suitable division of percentage between contractors, must combine data

No

MR Credit 6: Rapidly Renewable Materials

Requirement:

Use rapidly renewable building materials and products (made from plants that are typically harvested within a ten-year cycle or shorter) so that the sum of these materials constitutes at least 2.5%, based on cost, of the total value of materials on the project.

Notes:

ALWAYS Designer responsibility – identify materials and incorporate them into design.

Examples: bamboo, linoleum, cork, wheatboard, strawboard, cotton or soy

MR Credit 6: Rapidly Renewable Materials – Workshop Building

Estimated Contract Cost $795,000
LEED default option Materials Cost 45%: $357,750
Rapidly Renewable Materials Cost 2.5%: Minimum $8944

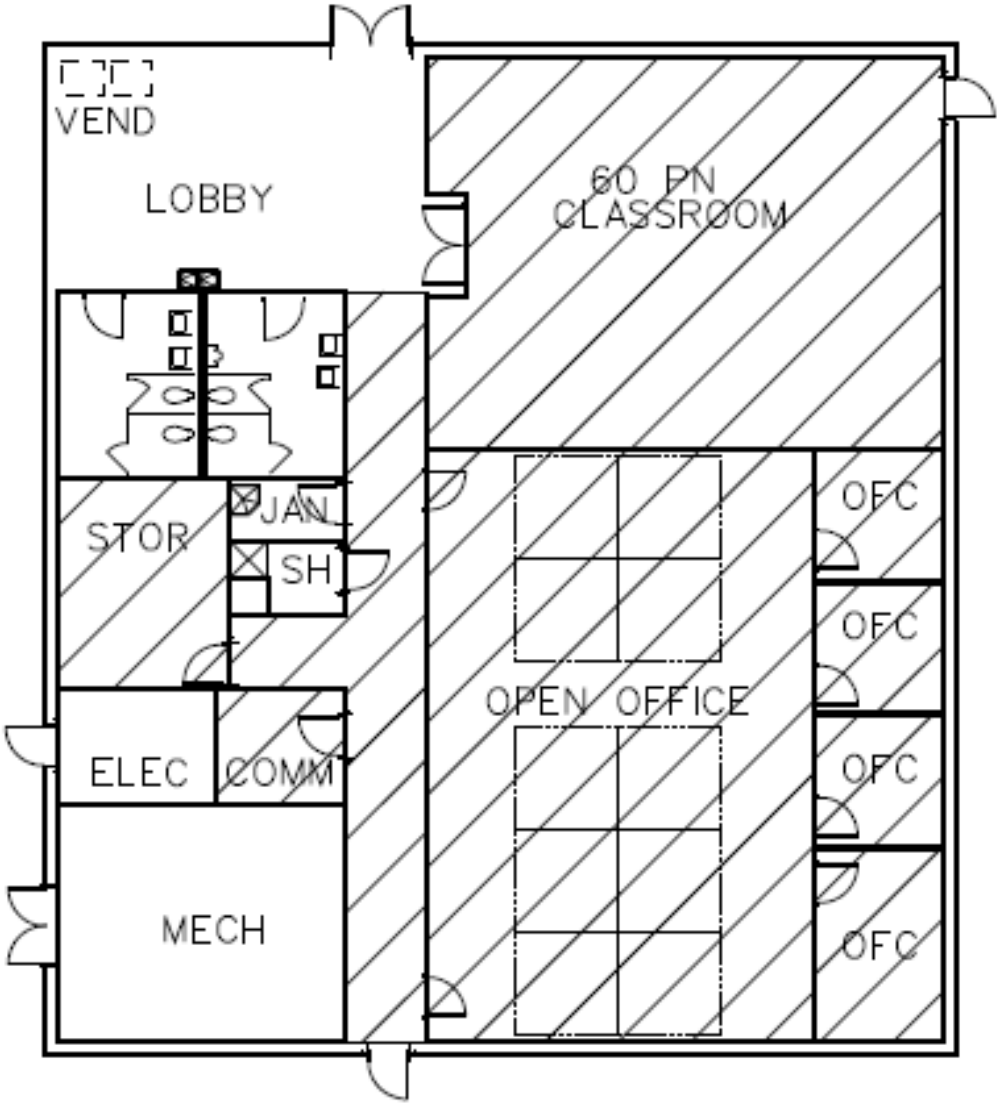
VCT (1/8”):
$1.50/sf mat, $1.00/sf inst, $2.50/sf total
Carpet (32 oz nylon):
$1.10/sf mat, $.35/sf inst, $1.45/sf total
Linoleum (rapidly renewable):
$2.50/sf mat, $5.00/sf inst, $7.50/sf total

To achieve minimum $8944 rapidly renewable materials cost using linoleum, need to use 3600sf of it.

Delta $5.00/sf installed cost x 3600sf = adds $18,000 total cost to project

MR Credit 6: Rapidly Renewable Materials

3678sf linoleum



May

MR Credit 7: Certified Wood

Intent:

Encourage environmentally responsible forest management.

Requirement:

Use a minimum of 50% of wood-based materials and products, which are certified in accordance with the Forest Stewardship Council's (FSC) Principles and Criteria, for wood building components.

Notes:

50% of the permanent wood in the building FSC Certified.

Includes (but not limited to) framing, subfloor, finish floor, doors, casework, finishes/trim.

Permanently incorporated items only (formwork n/a).

Can be designer or contractor responsibility (01 33 29).

Cost premium, availability varies by region – easier on jobs with little wood.

See LEED Reference Guide for composite/partial

Indoor Environmental Quality

This category covers productivity, comfort and well-being of building occupants.

2 prerequisites, 15 possible points

- *Indoor Air Quality*
  - *Outdoor air & ventilation*
  - *Contaminants in HVAC systems*
- *Low-emitting (low VOC) interior materials*
- *Thermal comfort and occupant control*
- *Lighting occupant control*
- *Occupant access to daylight and views*

Yes

EQ Prerequisite 1: Minimum IAQ Performance

Intent:

Establish minimum indoor air quality (IAQ) performance to enhance IAQ in buildings, thus contributing to the comfort and well-being of the occupants.

Requirement:

Meet the requirements of Sections 4 through 7 of ASHRAE 62.1-2004 Ventilation for Acceptable Indoor Air Quality. Mechanical systems shall be designed using the Ventilation Rate Procedure or the applicable local code, whichever is more stringent.

Notes:

As a LEED prerequisite, required on all projects

Yes

EQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control

Intent:

Minimize exposure of building occupants, indoor surfaces and ventilation air distribution systems to Environmental Tobacco Smoke (ETS).

Requirement:

Option 1 – Prohibit smoking in building. Locate any exterior designated smoking areas at least 25 feet from entries, outdoor air intakes and operable windows.

(Option 2 – designated smoking areas inside building not applicable)

Option 3 – Residential buildings only:

- **Prohibit smoking in common areas of building.**
- **Locate any exterior designated smoking areas at least 25 feet from entries, outdoor air intakes and common area operable windows.**
- **At each dwelling unit seal wall, chase, ceiling and floor penetrations.**
- **Weatherstrip doors from dwelling units to common hallway except where hallway has positive pressure differential average 5Pa, minimum 1Pa.**
- **Demonstrate dwelling unit sealing with blower door tests**

May

EQ Credit 1: Outdoor Air Delivery Monitoring

Requirement:

Install permanent monitoring systems that provide feedback on ventilation system performance. Equipment must generate an alarm when conditions vary more than 10% from setpoint (either through building automation system or audible alarm).

Mechanically Ventilated Spaces –

- Provide CO2 monitoring at all spaces with occupant density at least 25 occupants/1000 sf. Locate between 3 and 6 feet above floor.
- For each mechanical ventilation system serving lesser density spaces provide a direct outdoor airflow measurement device with 15% plus/minus accuracy from design minimum airflow rate.

Naturally Ventilated Spaces –

- Provide CO2 monitoring at all naturally ventilated spaces. Locate between 3 and 6 feet above floor.

Notes:

No

EQ Credit 2: Increased Ventilation

Intent:

Provide additional outdoor air ventilation to improve indoor air quality for improved occupant comfort, well-being and productivity.

Requirement:

Mechanically Ventilated Spaces –

- **Increase breathing zone outdoor air ventilation rates to all occupied spaces by at least 30% above the minimum rates required by ASHRAE 62.1-2004.**

Naturally Ventilated Spaces –

- **Design to meet the recommendations in the Carbon Trust Good Practice Guides 237.**

AND

- **Provide diagrams and calculations demonstrating system meets recommendations of CIBSE Applications Manual 10**

OR

- **Provide analytic room-by-room airflow model demonstrating 90% of occupied spaces meet ASHRAE 62.1 minimum airflow rates.**

Notes:

In mechanically ventilated buildings CONFLICTS with mandatory energy reductions – clarify/confirm feasibility if included in

Yes

EQ Credit 3.1: Construction IAQ Management Plan – During Construction

Intent:

Reduce IAQ problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.

Requirement:

Develop and implement an IAQ management Plan for construction and pre-occupancy that includes:

- **During construction meet or exceed recommended measures of SMACNA IAQ Guidelines for Occupied Buildings Under Construction, 1995, chapter 3.**
- **Protect stored on-site or installed absorptive materials from moisture damage.**
- **If permanently installed air handlers are used during construction, use filtration media with MERV 8 at each return grille and replace all filters immediately prior to occupancy.**

Notes:

Must follow above SMACNA Guidelines even though building is unoccupied while under construction.

Yes

EQ Credit 3.2: Construction IAQ Management Plan – Before Occupancy

Requirement:

Develop and implement an IAQ management Plan for pre-occupancy that includes:

Option 1 – Flush-out

- After construction ends and all interior finishes are installed and prior to occupancy, perform building flush-out by supplying total air volume of 14,000cf outdoor air per sf floor area, maintaining minimum 60 degrees temperature and maximum 60% relative humidity.

  OR

- Optional flush-out sequence for occupancy during flush-out.

OR

Option 2 – Air Quality Testing

Conduct baseline IAQ testing after construction ends and all interior finishes are installed and prior to occupancy, using protocols and meeting concentration limits in LEED Reference Guide. Flush-out and re-test if tests fail.

Notes:

Include in construction schedule

Can give contractor option of flush-out or testing.

Indoor Environmental Quality (EQ) Low-Emitting Materials Credits

Low-emitting materials credits include everything inside the exterior surface covering, including wall cavities, attics, above ceilings, ductwork. See LEED Reference Guide Supplemental Information section on these credits.

Yes

EQ Credit 4.1: Low-Emitting Materials – Adhesives & Sealants

Intent:

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirement:

All adhesives and sealants used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall comply with VOC limits of South Coast Air Quality Management District (SCAQMD) Rule 1168 (Green Seal Standard GS-36 for aerosol adhesives).

Notes:

Includes fire stopping, duct sealants, plumbing adhesives, construction adhesives as well as finish adhesives and sealants.

Field-applied only.

VOC budget Alternate Compliance Path available (individual

Yes

EQ Credit 4.2: Low-Emitting Materials – Paints & Coatings

Requirement:

All paints and coatings used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall comply with comply with VOC limits of South Coast Air Quality Management District (SCAQMD) and Green Seal standards listed in LEED (by coating type).

Notes:

Field-applied only.

VOC budget Alternate Compliance Path available (individual noncompliant products with overall low VOC performance)

Yes

EQ Credit 4.3: Low-Emitting Materials – Carpet Systems

Requirement:

- All carpet installed in the building interior shall meet testing and product requirements of Carpet and Rug Institute's (CRI) Green Label Plus program.
- All carpet adhesive shall meet VOC requirements of EQ4.1.
- All carpet cushion shall meet requirements of CRI Green Label program.

Notes:

Certified under Green Label Plus program or independently tested in accordance with requirements.

Must be carpet in the facility!! (no minimum amount)

3/22/07 CIR: Alternate Compliance Path now available for all hard surface flooring Greenguard Certified or

Yes

EQ Credit 4.4: Low-Emitting Materials – Composite Wood & Agrifiber Products

Requirement:

- All composite wood and agrifiber products used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall contain no added urea-formaldehyde resins.
- Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.
- Defined as: particleboard, MDF, plywood, wheatboard, strawboard, panel substrates and door cores.

Notes:

Furniture and equipment not included. Built-in casework is included.

Yes

EQ Credit 5: Indoor Chemical and Pollutant Source Control

Requirement:

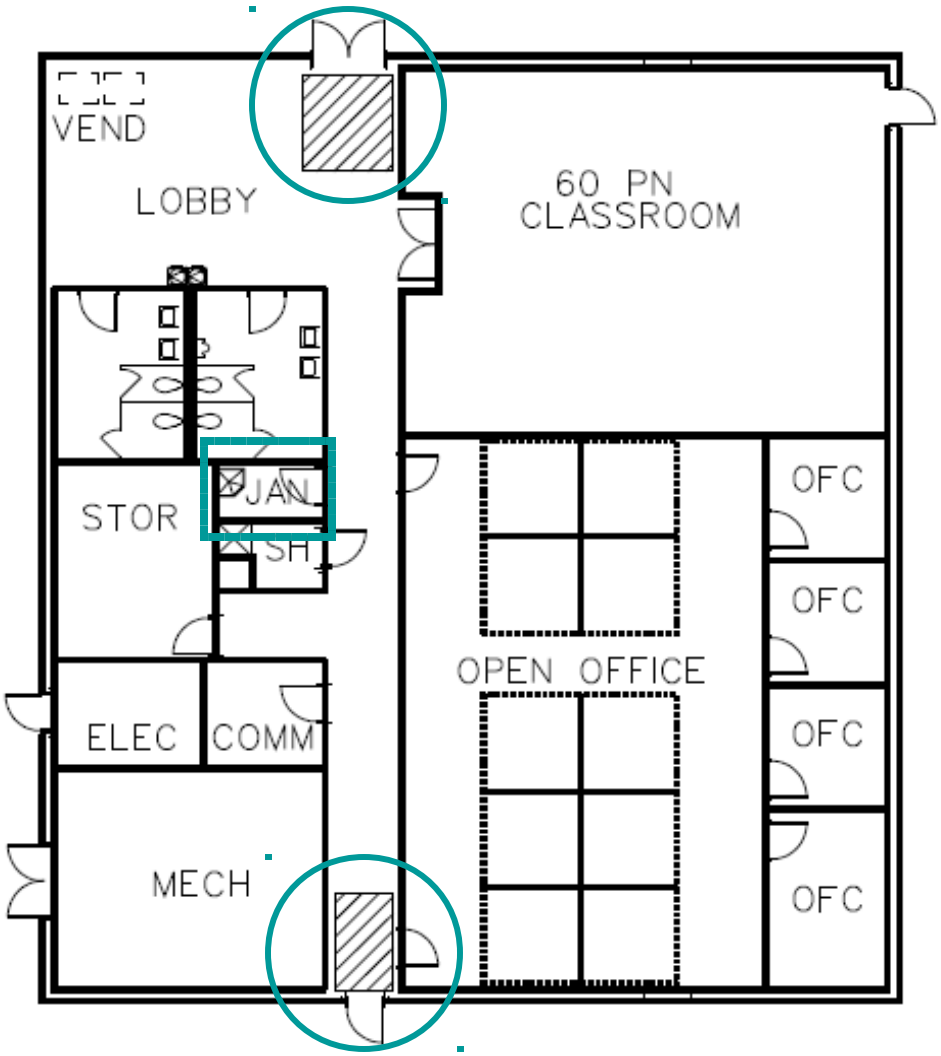
- Provide permanent entryway systems at least 6 feet long at all entryways that are directly connected to the outdoors (regular entry points for building occupants).
  - Acceptable systems are permanently installed grates, grilles or slotted systems that allow cleaning underneath.
  - Roll-out mats are acceptable only if maintained weekly by contracted service.
- Where hazardous gases or chemicals may be present or used (garages, housekeeping/laundry areas and copying/printing rooms):
  - Exhaust space to create negative pressure. Minimum 0.50 cfm/sf exhaust rate with no air re-circulation. Positive pressure differential average 5Pa, minimum 1Pa.
  - Provide closer on door
  - Provide hard ceiling or extend partitions to deck.
- In mechanically ventilated buildings, provide regularly occupied areas with MERV 13 filters immediately prior to occupancy (both return and outside supply air).

Notes:

MT Appendix L says assume no weekly service for roll up mats

Indoor Chemical and Pollutant Source Control

- Walk-off mats at regularly used occupant entries
- Seal/exhaust Janitor Closet? Depends on cleaning chemicals used (flooring materials)



No

EQ Credit 6.1: Controllability of Systems - Lighting

Intent:

Provide a high level of lighting system control by individual occupants or by specific groups in multi-occupant spaces to promote the productivity, comfort and well-being of building occupants.

Requirement:

Provide individual lighting controls for minimum 90% of the building occupants to enable adjustments to suit individual tasks and preferences.

AND

Provide lighting system controllability for all shared multi-occupant spaces (classrooms, conference rooms) to enable lighting adjustment that meets group needs and preferences.

Notes:

Individual task lighting in addition to ambient lighting for 90% of private offices and workstations.

Adjustability means, as a minimum, occupant on-off

No

EQ Credit 6.1: Controllability of Systems – Thermal Comfort

Requirement:

Provide individual comfort controls for minimum 50% of the building occupants to enable adjustments to suit individual tasks and preferences. Operable windows can be used for occupants 20 feet inside of and 10 feet either side of operable portion.

AND

Provide comfort system controls for all shared multi-occupant spaces (classrooms, conference rooms) to enable adjustments to suit group needs and preferences.

Notes:

Defined as control over at least one of the following: air temperature, radiant temperature, air speed and humidity.

Big open office needs underfloor system.

May

EQ Credit 7.1: Thermal Comfort - Design

Intent:

Provide a comfortable thermal environment that supports the productivity and well-being of building occupants.

Requirement:

Design HVAC and envelope to meet ASHRAE 55-2004, Thermal Comfort Conditions for Human Occupancy.

Notes:

Includes the following: air temperature, radiant temperature, air speed and

No

EQ Credit 7.2: Thermal Comfort - Verification

Intent:

Provide for the assessment of building thermal comfort over time.

Requirement:

Implement a thermal comfort survey of building occupants within a period of 6 to 18 months after occupancy.

Develop a corrective action plan if survey results indicate more than 20% of occupants are dissatisfied. Plan to include relevant environmental variables in ASHRAE 55-2004.

Notes:

This point CANNOT be earned unless EQ7.1 is earned (LEED Errata sheet).

MT Default (Appendix L) is assume NO post-occupancy activities by Government - revise if not so. ALWAYS

No

EQ Credit 8.1: Daylight and Views – Daylight 75% of Spaces

Requirement:

Option 1 – Glazing Factor Calculation. Achieve a minimum glazing factor of 2% in a minimum of 75% of regularly occupied areas.

OR

Option 2 – Daylight Simulation Model. Demonstrate through computer simulation that a minimum daylight illumination of 25fc has been achieved in 75% of regularly occupied areas.

OR

Option 3 – Daylight Measurement. Same as Option 2 but demonstrated through records of indoor light measurements (completed facility).

AND (ALL OPTIONS)

Provide glare control.

Notes:

Only the sf that meets the requirement counts (not whole rooms).

Regularly Occupied includes offices, meeting/classroom group areas. Does not include support spaces like copy, mechanical room, laundry, restrooms, corridors.

Very dependent on building layout.

Higher the glass the better.

EQ Credit 8.1: Daylight and Views – Daylight 75% of Spaces

LEED 2.2 Glazing Factor Tabulation Spreadsheet

Regularly Occupied Space ID	Regularly Occupied Space Name	Regularly Occupied Space Area (sf)	Sidelighting - Vision Glazing (area between 2'-6" & 7'-6")			Sidelighting - Daylight Glazing (area above 7'-6")			Toplighting - Sawtooth Monitor			Toplighting - Horizontal Skylight			Overall Glazing Factor
			Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	
	Open Office	1380	80	0.9	1.04348	32	0.9	0.41739		0.4	0		0.4	0	1.46
	Private Office 1	100		0.9	0		0.9	0			0			0	0.00
	Private Office 2	100		0.9	0		0.9	0			0			0	0.00
	Private Office 3	100		0.9	0		0.9	0			0			0	0.00
	Private Office 4	100		0.9	0		0.9	0			0			0	0.00
	Private Office 5	150		0.9	0		0.9	0			0			0	0.00
	Classroom	1200		0.9	0		0.9	0			0			0	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00

Total Regularly Occupied Space Area (sf)	Total Regularly Occupied Space Area w/ a Minimum 2% Glazing Factor	Percentage of Total Regularly Occupied Space w/ 2% Glazing
3130	0	0%

Fill in all regularly occupied spaces and area for each

Open Office: try 4EA windows 4’wide, 7’high, sill 2’6” AFF (4x5=20sf below 7’-6”, 4x2=8sf above 7’6”) NEED 10’ CLG HT

Glazing factor tabulation spreadsheet available at http://en.sas.usace.army.mil (same as LEED Letter Template)

EQ Credit 8.1: Daylight and Views – Daylight 75% of Spaces

LEED 2.2 Glazing Factor Tabulation Spreadsheet

Regularly Occupied Space ID	Regularly Occupied Space Name	Regularly Occupied Space Area (sf)	Sidelighting - Vision Glazing (area between 2'-6" & 7'-6")			Sidelighting - Daylight Glazing (area above 7'-6")			Toplighting - Sawtooth Monitor			Toplighting - Horizontal Skylight			Overall Glazing Factor
			Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	
	Open Office	1380	80	0.9	1.04348	32	0.9	0.41739		0.4	0	16	0.4	0.5797	2.04
	Private Office 1	100		0.9	0		0.9	0			0			0	0.00
	Private Office 2	100		0.9	0		0.9	0			0			0	0.00
	Private Office 3	100		0.9	0		0.9	0			0			0	0.00
	Private Office 4	100		0.9	0		0.9	0			0			0	0.00
	Private Office 5	150		0.9	0		0.9	0			0			0	0.00
	Classroom	1200		0.9	0		0.9	0			0			0	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00

Total Regularly Occupied Space Area (sf)	Total Regularly Occupied Space Area w/ a Minimum 2% Glazing Factor	Percentage of Total Regularly Occupied Space w/ 2% Glazing
3130	1380	44%

- Add 2EA 2’x4’ skylights
- Open Office plus all private offices < 75% of occupied area – must address classroom

EQ Credit 8.1: Daylight and Views – Daylight 75% of Spaces

LEED 2.2 Glazing Factor Tabulation Spreadsheet

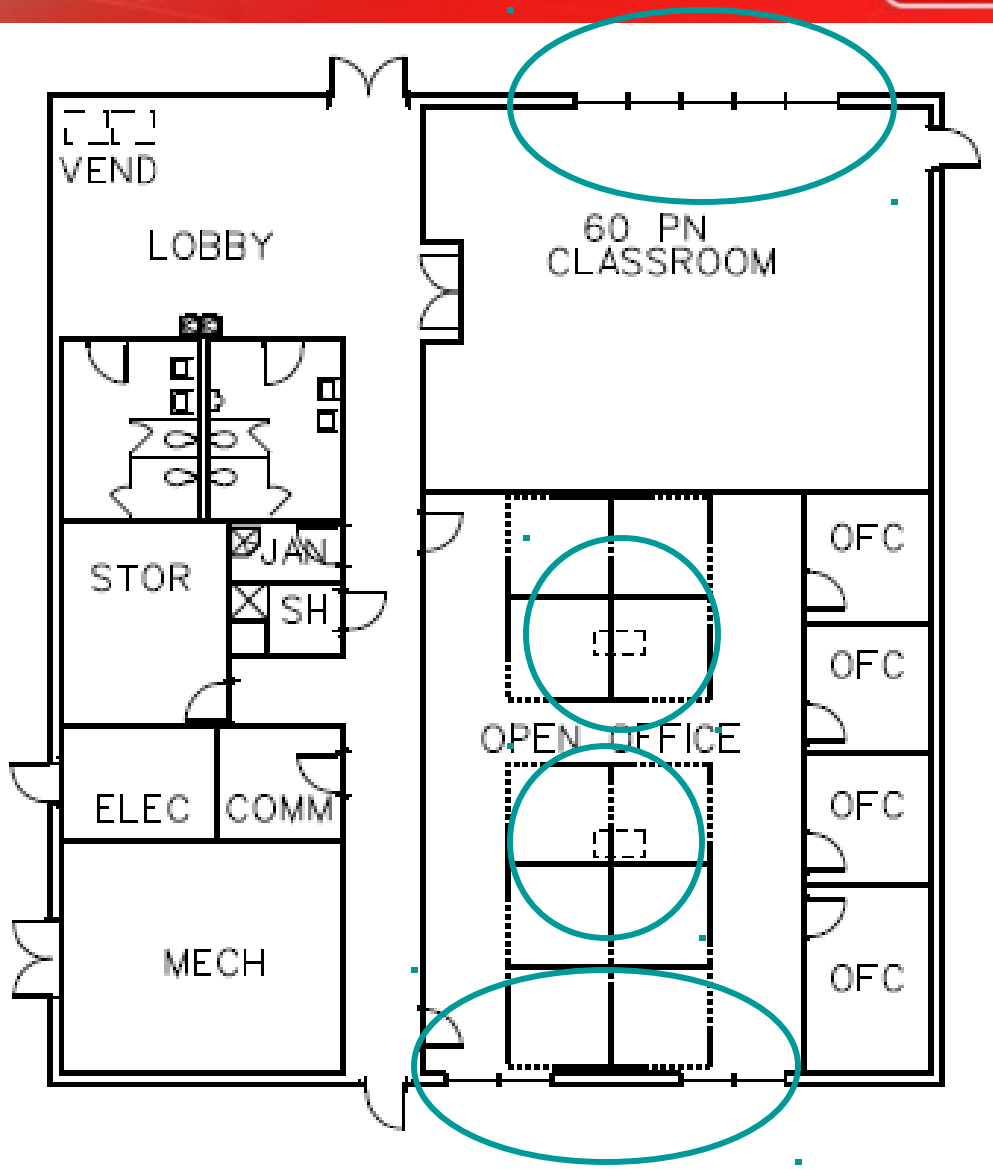
Regularly Occupied Space ID	Regularly Occupied Space Name	Regularly Occupied Space Area (sf)	Sidelighting - Vision Glazing (area between 2'-6" & 7'-6")			Sidelighting - Daylight Glazing (area above 7'-6")			Toplighting - Sawtooth Monitor			Toplighting - Horizontal Skylight			Overall Glazing Factor
			Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	
	Open Office	1380	80	0.9	1.04348	32	0.9	0.41739		0.4	0	16	0.4	0.5797	2.04
	Private Office 1	100		0.9	0		0.9	0			0			0	0.00
	Private Office 2	100		0.9	0		0.9	0			0			0	0.00
	Private Office 3	100		0.9	0		0.9	0			0			0	0.00
	Private Office 4	100		0.9	0		0.9	0			0			0	0.00
	Private Office 5	150		0.9	0		0.9	0			0			0	0.00
	Classroom	1200	100	0.9	1.5	40	0.9	0.6			0			0	2.10
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00

Total Regularly Occupied Space Area (sf)	Total Regularly Occupied Space Area w/ a Minimum 2% Glazing Factor	Percentage of Total Regularly Occupied Space w/ 2% Glazing
3130	2580	82%

- Don't want skylights in Classroom (A/V)
- Classroom: try 5EA windows 4'wide, 7'high, sill 2'6" AFF (4x5=20sf below 7'-6", 4x2=8sf above 7'6")

EQ Credit 8.1: Daylight and Views – Daylight 75% of Spaces

- Windows at Classroom
- Windows & skylights at Open Office
- Can add windows at private offices but not required for this credit
- Ceiling height is important



May

EQ Credit 8.1: Daylight and Views – Views for 90% of Spaces

Requirement:

Achieve direct line-of sight to the outdoors via vision glazing between 2’-6” and 7’-6” above finish floor for building occupants in 90% of all regularly occupied areas.

Notes:

Diagram line-of-sight view areas for all regularly occupied spaces on floor plan. Line of site is from 42” AFF.

Can include interior glazing.

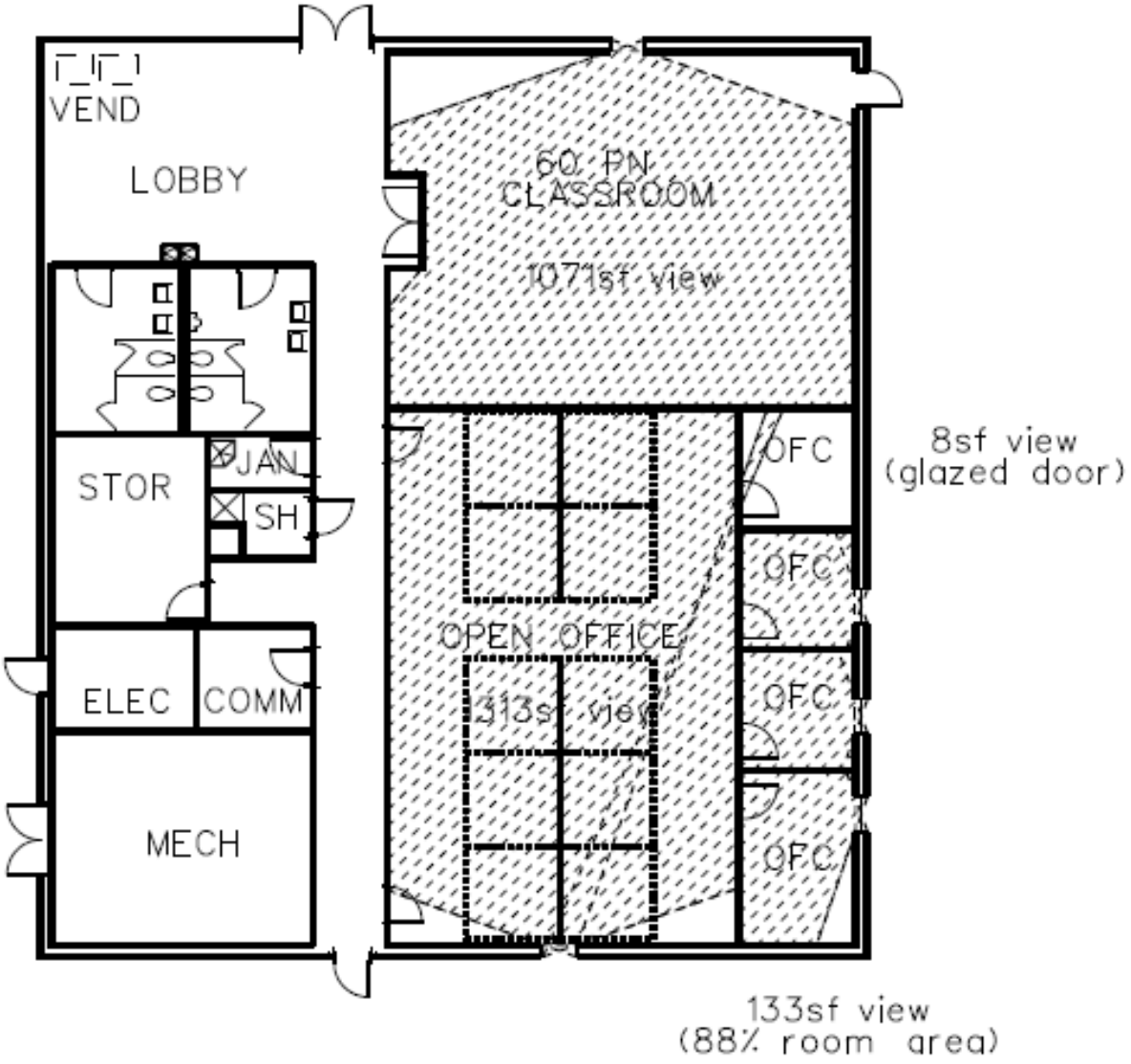
For private offices can count whole room area if 75% of room is within view area as diagrammed. For multi-occupant spaces only the sf that meets the requirement counts (not whole rooms).

Regularly Occupied includes offices, meeting/classroom group areas. Does not include support spaces like copy, mechanical room, laundry, restrooms, corridors.

EQ Credit 8.1: Daylight and Views – Views for 90% of Spaces

Diagram Views:

- **Shared spaces – count only actual view area**
- **Private offices – count actual view area except count whole room area if view area is greater than 75% of room area**
- **Include diagramming plan in contract docs "for reference only"**



EQ Credit 8.1: Daylight and Views – Views for 90% of Spaces

LEED 2.2 Glazing Factor Tabulation Spreadsheet																VIEWS
			Sidelighting - Vision Glazing (area between 2'-6" & 7'-6")			Sidelighting - Daylight Glazing (area above 7'-6")			Toplighting - Sawtooth Monitor			Toplighting - Horizontal Skylight				
Regularly Occupied Space ID	Regularly Occupied Space Name	Regularly Occupied Space Area (sf)	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Overall Glazing Factor	Portion of Space with Access to Views (sf)
	Open Office	1380	20	0.9	0.26087	8	0.9	0.10435		0.4	0		0.4	0	0.37	1313
	Private Office 1	100		0.9	0		0.9	0			0			0	0.00	8
	Private Office 2	100		0.9	0		0.9	0			0			0	0.00	100
	Private Office 3	100		0.9	0		0.9	0			0			0	0.00	100
	Private Office 4	100		0.9	0		0.9	0			0			0	0.00	100
	Private Office 5	150		0.9	0		0.9	0			0			0	0.00	150
	Classroom	1200	20	0.9	0.3	8	0.9	0.12			0			0	0.42	1071
					-			-			-			-	0.00	
					-			-			-			-	0.00	
					-			-			-			-	0.00	
					-			-			-			-	0.00	
					-			-			-			-	0.00	
					-			-			-			-	0.00	

Total Regularly Occupied Space Area (sf)	Total Regularly Occupied Space Area w/ a Minimum 2% Glazing Factor	Percentage of Total Regularly Occupied Space w/ 2% Glazing (75% required)	Total Regularly Occupied Space Area w/Access to Views	Percentage of Total Regularly Occupied Space w/Access to Views (90% required)
3130	0	0%	2842	91%

EQ Credit 8.1: Daylight and Views – Views for 90% of Spaces

- Consider early in the design process.
- Highly dependent on building layout.
- For daylighting the higher the glazing the better (ceiling heights).
- MUST collaborate with mech & elec on glazing decisions (envelope, lighting controls)

Innovation & Design Process (ID)

This category covers exemplary performance in an established LEED credit and/or innovative performance in green building categories not addressed in LEED, and LEED Accredited Professional (LEED AP) team member.

5 possible points

This is where you can create your own LEED credits (up to 4).

Yes

ID Credits 1.1 – 1.4: Innovation in Design

Requirement:

Up to 4 available.

Exemplary Performance in an existing credit –

- **LEED Reference Guide states availability to credit and requirements for exemplary performance ID credit for each credit (example waste diversion achieve 95%).**
- **GREATLY EXCEED - Generally, double the credit requirement or next increment of achievement.**

Innovations not addressed in LEED –

- **Comprehensive approach, significant, measurable environmental benefits**
  - **Demonstrate quantitative performance improvements for environmental benefit over defined baseline.**
  - **Must be comprehensive**
  - **Formula applicable to other projects**

Notes:

Find existing approved ID credits at USGBC catalog of potential Innovation in Design credits at: http://www.usgbc.org/ShowFile.aspx?DocumentID=3569

Technical evaluations: get clarification if ID credit is taken but not named or described.

Yes

ID Credit 2: LEED Accredited Professional

Intent:

To support and encourage the design integration required by a LEED-NC green building project and to streamline the application and certification process.

Requirement:

At least one principal participant of the project team shall be a LEED Accredited Professional (AP).

Notes:

USACE requires a LEED AP on all design and construction teams. *BECOME ONE!!!*

After transition to new credentialing system 2009, Legacy AP will NOT qualify for this credit.

LEED 2009 – What's Different, What Stays the Same

Changes:

Total number of possible points goes from 69 to 100

Point value of individual credits will be re-weighted

Matching of similar credits among the various LEED rating tools

Regionally preferred credits will earn extra points in that region (ID credits)

Still the Same:

4 achievement levels (number of points required for each will change)

Letter Templates, registration, certification processes the same (revised Templates for LEED 2009)

Notes:

Projects registered under Version 2.2 will stay with 2.2.

Eventually USGBC will no longer accept 2.2 registrations

Future: Projects may combine credits from all rating tools

Army will evaluate and issue guidance

Questions, Feedback

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation & Design Process
- LEED 2009

LEED During Planning Charettes & Code 3 Activities

Devote the time and thought needed here or you will have to swim upstream later!!

Current Requirements Review (Army)

- All vertical new construction/major renovation & repair – LEED Silver (min 33 points)
- Includes tenant organizations (SOF, DoD)
- Horizontal construction – exempt from Silver but not from LEED
- Buildings not climate controlled – exempt from Silver but not from LEED (human comfort)
- Minor renovation & repair - exempt from Silver but not from LEED
- Mandatory 50% waste diversion
- EPAct mandatory 30% energy reduction (all federal agencies)
- Certifiable - “Able to achieve USGBC certification if submitted”
- AFH & RCI still SPIRIT “Gold” pending Army adoption of LEED Homes

Planning Charettes and Performance RFPs

- Still need to go through the same process when performance RFP is anticipated
  - Generate and use theoretical building footprints
  - Generate and use theoretical site plan
- Army Standard designs: get building footprint from COS, coordinate theoretical site plan with COS

Even when RFP may not mandate or show building or site plans, this is a critical reality check and funding exercise

Planning Charette

- MOST CRITICAL TIME to address **big picture issues** for the Installation that relate to LEED
  - Long-range plan for meeting renewable energy mandate
  - Traffic/mass transit/parking issues
  - Pedestrian circulation system/sidewalks
  - Density/future development issues
  - Habitat/environmental land set-asides
  - Renovation versus new construction

Planning Charette

- MOST CRITICAL TIME to capture **funding** needed for certain LEED credits
  - Rainwater collection structures
  - Stormwater control structures
  - Central energy plant, fuel cell
  - On-site renewable energy features (pv, solar, wind, geothermal)
  - Deconstruction, relocation, demolition
  - Porous pavement

Capture Supporting Facilities line items!!

Planning Charette

- Consider LEED when establishing site location and site boundaries
  - Proximity to wetlands, waters, 100 yr flood elevation
  - Proximity to basic services, bus stops
  - Sidewalks to basic services
  - Need larger site for parking shade islands
  - Need larger site for habitat restoration area
  - Need room for on-site stormwater retention, rainwater collection structures
  - Need room for on-site renewable energy features if planned

Planning Charette

- Get the **RIGHT INSTALLATION PLAYERS** at the charette to address LEED issues
  - Energy management (renewable energy)
  - Traffic/mass transit
  - Environmental
  - Master Planning
  - User
  - COS if applicable
- Request info/input/participation in advance of the charette

USACE LEED-NC Implementation Guide

Appendix A

- Identifies Installation role in each credit

LEED Credit Paragraph	LEED 2.2 Army Credit Guidance	Required - Preferred - Awards	Installation Primary Responsibility - Support Responsibility	
PAR	FEATURE			REMARKS
CATEGORY 1 - SUSTAINABLE SITES (14 POSSIBLE POINTS)				
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	Rqd		All LEED prerequisites are required to be met. Related to compliance with 40 CFR 122.26 (Clean Water Act).
SS1	Site Selection		Prim	Credit is determined by Installation's site selection. Installation provides all necessary site data to support documentation of this credit.

USACE LEED-NC Implementation Guide Appendix A

- Includes commentary on issues to consider for each credit
- Quick reference to take to charette

SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 1		Spt	Requires provision of vehicles, which cannot be purchased with construction funds. To earn this credit option, Installation must provide vehicles.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 2			Credit is easily earned at minimal first cost.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 3		Spt	Requires provision of vehicle refueling stations. Installation must support type of fuel and commit to maintaining/supporting refueling stations.
SS7.1	Heat Island Effect: Non-Roof		Spt	Provision of shade islands requires larger area for parking and must be considered in determination of site boundaries. Cost of pervious pavement must be identified and funded in programming.

LEED-NC Application Guide for Multiple Buildings and On-Campus Projects (AGMBC)

- Consolidated parking lots
- Consolidated open space instead of adjacent to building
- Group average instead of individual on-site renewable energy
- Central chilled water system CFC phase-out plan for refrigerant management

Charette Report

- Include completed LEED Project Checklist indicating the points to be earned
  - Do not use the “?” block on the LEED checklist except for possible points beyond the minimum requirement – generate a specific point strategy and ensure site and budget coordinate with it
- Include narrative/commentary on special features related to individual points included to capture thought process & intent

Funding/DD1391 Preparation – Primary Facility

- Army/USACE guidance (27 April 07 ACSIM memorandum), beginning FY09:
  - Add default 2% separate line item “SDD & EPAct05” to Primary Facility (cat code 00005)
  - If multiple Primary Facilities, provide separate sub-line item for each facility
- This line item covers the added cost of going from LEED Certified to LEED Silver for the facility
- Do not add for exempt (non-climate controlled) facilities
- If cost add is expected to exceed 2%, provide explanation in Block 10 (Description of Proposed Construction) describing special features

Funding/DD1391 Preparation - Supporting Facilities

- Include SDD site features as line item costs under Supporting Facilities
- If SDD site feature causes Supporting Facilities to exceed target of 25% of Primary Facility, make it a sub-line item under the "SDD & EPACT" Primary Facility line item and describe in Block 10 Description of Construction.

Devote the time and thought to develop a real strategy and include the funding for it!!

Code 3/Parametric Estimate

- CRITICAL ACTIVITY - Last chance to review and validate project scope and to correct 1391 before funds are locked
- Parametric Estimate (3086): same guidance as DD1391 (default 2% separate line item “SDD & EPAct05” to Primary Facility) except:
  - If cost add is expected to exceed 2%, submit Sustainable Cost Template filled in to show costs for all points and cost delta between Certified and Silver
  - Sustainable Cost Template is not required except when Certified-to-Silver cost delta exceeds 2%
  - Find template at hot link through archived ECB 2006-2 (all ECBs are at wbdg.org/ccb) http://www.wbdg.org/ccb/browse_archive.php?o=31&c=214

Sustainable Cost Template

Put cheap/free points in the Certified column (you get no extra $ $ for them)

Facility Points Summary

Item No 1 (COL -1)	Sustainable Sites (SS) (COL-2)	Max Points (COL-3)	Points for Certified (COL-4)	Extra Points for Silver (COL-5)
SS Preq 1	Construction Activity Pollution Prevention	[Pre-Requisite]		
SS Credit 1	Site Selection	1		
SS Credit 2	Development Density & Community Connectivity	1		
SS Credit 3	Brownfield Redevelopment	1		
	Alternative Transportation			
SS Credit 4.1	Public Transportation Access	1		
SS Credit 4.2	Bicycle Storage & Changing Rooms	1		
SS Credit 4.3	Low-Emitting and Fuel-Efficient Vehicles	1		
SS Credit 4.4	Parking Capacity	1		
	Site Development			
SS Credit 5.1	Protect or Restore Habitat	1		
SS Credit 5.2	Maximize Open Space	1		
	Stormwater Design			
SS Credit 6.1	Quantity Control	1		
SS Credit 6.2	Quality Control	1		
	Heat Island Effect			
SS Credit 7.1	Non-Roof	1		
SS Credit 7.2	Roof	1		
SS Credit 8	Light Pollution Reduction	1		
	CATEGORY SUBTOTAL	14	0	0

Sustainable Cost Template

- Put cost for Silver points on right side
- Indicate cost category
- Indicate payback if known

Cost Increase (Decrease) To Achieve LEED Silver Rating (1/)						
Increased Design Cost for Silver (COL-6)	Increased/Decreased Construction Cost				DD1391 Cost Category (Suggested) 4/ (COL-11)	Annual Saving & Simple Payback Period if Known
	Suggested UOM 2/ (COL-7)	QTY (COL-8)	UC (COL-9)	Total Cost 3/ (COL-10)		
	LS				S-SI	
	-					
	-					
	Spaces				S-SI/ WBS-9	
	-					
	Spaces/SY				S-SI	
	SY/CY				S-SI	
	(SF)					
	GPD/LS				S-SD	
	GPD/LS				S-SD	
	(SY/LS)				S-SI	
	SF/LS				WBS-3	Potential Savings
	(FC/LS)				S-SE	
0				0		

Sustainable Cost Template

Summarize Primary Facility delta costs

If exceeds the 2% default, use this number instead on 3086

Sustainable Cost Summary							
Primary Facility SDD Cost				Cost Category from Col. # 11			
Substructure				WBS-1			
Superstructure				WBS-2			
Exterior Closure				WBS-3			
Roofing				WBS-4			
Interior Construction				WBS-5			
Interior Finishes				WBS-6			
Conveying System				WBS-7			
Plumbing				WBS-8			
HVAC				WBS-9			
Fire Protection Systems				WBS-10			
Electric Power & Lighting				WBS-11			
Electrical Systems				WBS-12			
Equipment				WBS-13			
Furnishings				WBS-14			
Special Construction				WBS-15			
	TOTAL PRIMARY FACILITY SDD COSTS =						

Sustainable Cost Template

Support Facility SDD Cost	Cost Category from Col. # 12
Electric Svc	S-SE
Water Sewer Gas	S-WSG
Steam/Chilled Water Distribution	S-SCW
Paving Walks Curbs Gutters	S-PWC
Storm Drainage (Code S-SD)	S-SD
Site Imp., Demo (Code S-SI)	S-SI
TOTAL SUPPORT FACILITIES SDD COSTS =	

- Summarize Support Facility delta costs
- Always include this cost as Support Facilities line item(s)
- Last page of the Sustainable Cost Template has instructions on how to fill it out
  - Include Contractor OH and Profit, do not include contingency or SIOH
- Sustainable Cost Template is required to be submitted with 3086 only if Primary Facility cost delta exceeds the 2% default

Questions, Feedback

- Planning Charettes
- Code 3/Parametric Estimate
- Sustainable Cost Template

LEED During RFP Development

Appendices B and C of USACE LEED Implementation Guide contain sample RFP language for regular and COS Multiple Contractor RFPS

Review of MILCON Transformation (MT) Concept

- Performance RFP, not prescriptive
- Industry Standards
- Uniform RFP all USACE Districts (mandatory MT RFP wizard)

RFP sample text in this presentation is taken from MT RFP wizard. MT RFP wizard is at https://ff.cecer.army.mil/rfp_wizard/. Contact Susan Nachtigall at ERDC-CERL for access privileges. The website has a sample for review available without access privileges.

Statement of Work

- Identify minimum LEED rating (Silver)
- Identify buildings in the project that are exempt from LEED Silver (non-climate controlled)
- If project has more than one building, require use of LEED Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC) for scoring

Statement of Work

- Indicate if LEED **registration**/use of LEED Letter Templates is required
  - Beginning FY09, registration is required for ALL projects with LEED Silver requirement (ECB 2008-27)
  - Indicate who registers project and pays fee ($450), indicate who administers online project
- If project is exempt from LEED Silver, PDT may still require registration (documentation format for the points that will be earned)
- If registration is not required, always permit Contractor the option to register project and use LEED Letter Templates

Registered Project Administration Options

- DB Contractor to register and administer.
- Government register and administer (furnish applicable templates to DB Contractor to fill in and return).
- Third party (RFP preparer or LEED consultant) to register and administer through closeout (coordination requirements must be in RFP, consider consultant services if seeking USGBC certification).
- Special case for COS Multiple Contractor Combined Project (to follow).

Staffing, third party contract issues depending on how handled.

Statement of Work

- Indicate if **USGBC Certification** is required
  - Beginning FY09, Army & Air Force will select projects that require USGBC certification (5% total program)
- If certification is required, indicate who is responsible for paying certification fee ($2,000 to $20,000, based on sf), coordinating with USGBC, obtaining certification (Contractor, Government or Government's consultant)
- Certification is in addition to, does not replace Government Validation
- If certification by Contractor is not required, always have default language requiring Contractor support of certification at no added cost if Government chooses to seek it

Statement of Work - Registration

Statement of Work paragraph "LEED Credit Validation"

If registration is not required:
USGBC registration and use of the LEED Letter Templates is not required. Contractor has the option to register the project and use the LEED Letter Templates. In this case, payment of registration fees and administration of the online project will be by the Contractor.

If registration is required:
USGBC registration and use of the LEED Letter Templates is required. Registration and payment of registration fees will be by the [Contractor] [Government]. Administration of the online project will be by the [Contractor] [Government].

Statement of Work - Certification

Statement of Work paragraph "LEED Credit Validation"

If certification is not required:
Validation of credits will be accomplished by the Government. USGBC certification of the project by the Contractor is not required. The Government may choose to seek USGBC certification of the project, in which case the Government will pay certification fees and coordinate with USGBC and the Contractor will furnish audit data as requested at no additional cost.

If certification is required:
Validation of credits will be accomplished by the Government. USGBC certification of the project by the Contractor is required. The Contractor will obtain USGBC certification prior to project closeout. Application, payment of certification fees and all coordination with USGBC during the certification process will be by the Contractor. USGBC interim review of design phase data is not required by the Government but is recommended.

Statement of Work

- Tell Proposers the status of LEED credits that are outside the scope of the DB project
  - **SS1 Site Selection (proximity to wetlands & 100 year flood elevation, prime farmland, parkland)**
  - **SS2 Development Density & Community Connectivity (neighborhood density or proximity to 10ea listed basic services)**
  - **SS3 Brownfield Redevelopment**
  - **SS4.1 Alternative Transportation: Public Transportation Access (distance from 2 bus line stops or 1 commuter rail stop)**
  - **EA6 Green Power (purchase of green power for facility)**
- Option: SS5.2 Site Development: Maximize Open Space (AGMBC allows consolidated remote open space – must be coordinated in advance with Installation)

Don't make each Proposer research this independently or guess

Statement of Work

- Indicate **mandatory credits**
  - MR2.1 50% Waste Diversion
  - EA1 Optimize Energy Performance (points associated with EPACT compliance)
    - EPACT % calculations use energy units, exclude process loads. LEED % calculations use $, include process loads – must do additional calculations for LEED
    - CERL EPACT prescriptive compliance path (no calculations required) for certain standard design buildings ("Technology Solution Set" included in MT RFP wizard) – they are adding summary & process load data to these to allow LEED calculations when using Technology Solution Set (POC is Dale Herron at ERDC)
    - RFP must provide utility cost data

Statement of Work

- Indicate **preferred credits** using LEED Project Credit Guidance Appendix
  - Not all credits, not 33 credits
  - Just what Inst. feels strongly about
  - Recommend use multiple 1s, 2s and 3s
  - Blank = no preference
  - X = preference not applicable (site selection credits)

PAR	FEATURE	LEED 2.2 Credit Paragraph	Army Guidance: Required - Preferred - Avoid	Project Preference Ranking: (1=most preferred, blank=no preference, X=preference not applicable to this credit, Rqd=required)	REMARKS
		LEED Project Credit Guidance			
CATEGORY 1 - SUSTAINABLE SITES (14 POSSIBLE POINTS)					
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)		Rqd	Rqd	All LEED prerequisites are required to be met. Related to compliance with 40 CFR 122.26 (Clean Water Act).
SS1	Site Selection			X	See paragraph LEED CREDITS COORDINATION for information relating to this credit.

Statement of Work

- Indicate Proposer **assumptions info** for some credits using LEED Project Credit Guidance Appendix
  - Revise appendix text for project-specific variations
- Include this appendix even when there are no preferred credits
- Download template at MT wizard website (Appendix L)

EA3	Enhanced Commissioning			during design phase and continue well beyond beneficial occupancy. Assume Government will not provide CxA post-occupancy activities unless indicated otherwise.
EA4	Enhanced Refrigerant Management			
EA5	Measurement & Verification			Credit relates to EPACT metering requirements. Provider and funding of post-occupancy activities must be coordinated. Assume Government will not provide post-occupancy activities unless indicated otherwise.
EA6	Green Power		X	Credit is determined by Installation's purchase of green power. See paragraph LEED CREDITS COORDINATION for information relating to this credit.

Statement of Work

- Provide EAPR1 Fundamental Commissioning Owner's Project Requirements (OPR) Document (required for LEED documentation)
  - Appendix to RFP - One OPR for each non-exempt building in project
  - For standard designs obtain OPR from COS
  - For non-standard designs RFP Preparer develops OPR
  - USACE template document available at http://en.sas.usace.army.mil, "Engineering Criteria"
  - When preparing OPR recommend refer to Statement of Work as much as possible to avoid conflicts

Special Construction Waste Management Requirements

- **SWAR** is Army solid waste reporting system – need to furnish Contractor's quarterly and closeout waste diversion reports to Installation SWAR coordinator – language for this is included in MT template for Section ENVIRONMENTAL PROTECTION
- Quarterly report requirement is also included in LEED Documentation & Submittals Checklist

Special Recycled Content Requirements: EPA Comprehensive Procurement Guidelines (CPG)

- Contributes to LEED recycled content, but must always be done regardless of LEED
- UFGS 01 62 35 RECYCLED/RECOVERED MATERIALS – INCLUDE IN ALL PROJECTS (DB version)

LEED Documentation

- "Certifiable" project is the requirement
  - Apply USGBC standards of interpretation
  - Match USGBC documentation requirements
  - Requirements included in RFP Sections "Design After Award" and "Design Build Project Closeout"

Design After Award Section

- Require LEED AP design through closeout
- Require incorporation of LEED requirements in drawings and specs
- Require LEED Project Checklist, LEED documentation as separable part of Design Analysis
- Require submittals to conform to LEED Documentation Requirements and Submittals Checklist
  - Include LEED Documentation Requirements and Submittals Checklist as attachment to section
- Government right to audit any credit
- Provide evidence of USGBC certification & install plaque at closeout if certification is required

Design After Award Spec – Sample MT Language

3.5.2.1 LEED Documentation:

The Contractor shall assign a LEED Accredited Professional, responsible to track LEED planning, performance and documentation for each LEED credit through construction closeout. Incorporate LEED credits in the plans, specifications and design analyses. Develop LEED supporting documentation as a separable portion of the Design Analysis and provide with each required design submittal. Include the LEED Project checklist for each non-exempt facility (one checklist may be provided for multiple facilities in accordance with the LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects) and the LEED 2.2 Documentation Requirements and Submittals Checklist (Attachment E, herein) with each submittal. Final design submittal for each portion of the work must include all required design documentation relating to that portion of work (example - all site credit design documents with final site design). Submittal requirements are as indicated in Attachment E, LEED 2.2 Documentation Requirements and Submittals Checklist. Submit all documentation at final design (for fast-track projects with multiple final design submittals, this shall be at the last scheduled final design submittal). All project documentation related to LEED shall conform to USGBC requirements for both content and format, including audit requirements and be separate from other design analyses. The Contractor shall maintain and update the LEED documentation throughout project progress. The designers of record shall prepare and present LEED documentation with calculations and other data necessary to substantiate and support all design documents submitted. The Government may audit any or all individual credits. Provide the additional documentation marked "Provide for Credit Audit Only" in LEED 2.2 Documentation Requirements and Submittals Checklist if requested for any individual credit. Audit documentation is not required unless requested.

LEED Documentation Requirements and Submittals Checklist

- Point by point what and when required (for both design and construction)
- Follows USGBC with exceptions noted (USGBC interest versus USACE interest)
- Excel spreadsheet located at http://en.sas.usace.army.mil, “Engineering Criteria”
- Include in RFP as an attachment to Design After Award section

LEED Documentation Requirements and Submittals Cl

Project Name
Project Location

LEED 2.2 Documentation Requirements and Submittals Checklist

Project Number
Submittal Name

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED 2.2 Documentation Requirements and Submittals Checklist for Government-Validated Project		Provide for Credit Audit Only		Date Submitted (to be filled in by Contractor)	Government Reviewer's Use - Comments/Approved
PAR		FEATURE	DUE AT		REQUIRED DOCUMENTATION	DATE	REV
GENERAL							
	GENERAL - All calculations shall be in accordance with LEED 2.2 Reference Guide.						
	GENERAL: Obtain excel version of this spreadsheet at http://en.sas.usace.army.mil, "Engineering Criteria".						
	GENERAL - For all credits, narrative/comments may be added to describe special circumstances or considerations regarding the project's credit approach.						
	GENERAL - Include all required LEED drawings indicated below in contract drawings with applicable discipline drawings, labeled For Reference Only.						
	NOTE: Each submittal indicated with "**" differs from USGBC certified project submittals by either having a different due date or being an added submittal not required by USGBC.						
			Closeout		List of all Final Design submittals revised after final design to reflect actual closeout conditions. Revised Final Design submittals. - OR - Statement confirming that no changes have been made since final design that effect final design submittal documents.		
CATEGORY 1 - SUSTAINABLE SITES							
SSPR1		Construction Activity Pollution Prevention (PREREQUISITE)	**Final Design		List of drawings and specifications that address the erosion control, particulate/dust control and sedimentation control measures to be implemented.		
			**Final Design		Narrative that indicates which compliance path was used (NPDES or Local standards) and describes the measures to be implemented on the project. If a local standard was followed, provide specific information to demonstrate that the local standard is equal to or more stringent than the NPDES program.		

Construction Closeout Submittals Section

- Require documentation updated monthly during construction and always available at jobsite for review
- Closeout submittal is LEED Project Checklist, All LEED documentation, completed LEED Documentation Requirements and Submittals Checklist – falls under “Other As-Builts”
- Require LEED Review meetings before and after closeout submittal
  - Include all parties at meeting including Installation representative
  - Formal endorsement of final score by all parties at closeout review meeting

- **Sample MT language (Section CLOSEOUT SUBMITTALS)**

LEED REVIEW MEETINGS

Pre-Closeout Meeting. Approximately 30 days before submittal of LEED closeout documentation, the Contractor and the Government's project delivery team (including Installation representative) will meet to review the documentation, determine which, if any, credits will be audited and identify any corrections/missing items prior to the closeout LEED documentation submittal.

Approximately 14 days after submittal of LEED closeout documentation, the Contractor and the Government's project delivery team (including Installation representative) will meet to review the LEED closeout documentation. The review conference will include discussion of and resolution of all review comments to ensure consensus on achievement of credits and satisfactory documentation. At the review conference a final score will be determined and endorsed in writing by all parties.

Offeror Proposal

- **Qualifications Proposal**:
  - Require description of LEED or SPIRIT experience in SPECIALIZED EXPERIENCE, SUBMISSION REQUIREMENTS, SUPPLEMENTAL NARRATIVE
  - Give evaluation preference to teams demonstrating successful USGBC project certification
- **Technical Proposal**:
  - Require LEED Project Checklist indicating proposed credits and total
  - Give evaluation preference to inclusion of credits indicated as preferred (in Appendix L LEED Project Credit Guidance)

Technical Evaluation

- Confirm mandatory, prohibited credits
- Request clarifications on inconsistencies between LEED points and other portions of proposal
  - Daylight, views points versus room layout & fenestration
  - 30% energy reduction versus building envelope/insulation
  - Bike rack/shower credit versus shower on plans
  - Site heat island credit versus shaded, porous & concrete pavement
  - Open space credit versus adjacent open space shown
  - Water use reduction credit versus proposed fixtures
- Confirm correct assumptions on credits that require post-occupancy activities
- Review proposed ID credits for consistency with USGBC standards (consult USGBC published catalog of approved ID credits at usgbc.org)

Make sure they have the Recycles Room!

Technical Evaluation – Who Does What

SAS

- Each technical discipline plus LEED reviewer
- Technical discipline reviewers review for claimed LEED points versus items within their discipline
  - Each discipline coordinates with LEED reviewer on discipline-specific issues & comments made
- LEED reviewer reviews:
  - Overall points total
  - Mandatory & prohibited points
  - Correct assumptions on post-award activities
  - Proposed ID points
  - After coordination with disciplines, summarizes number of points required, number of acceptable points, number of unacceptable points and number of points requiring clarification. Also notes any missing prerequisites.

Conformed Proposal

- Conformed Proposal is a Prescribed Reporting Point
  - Formal endorsement by all parties INCLUDING INSTALLATION REPRESENTATIVE of LEED Project Checklist

Multiple Contractor Combined Project (COS)

- ONLY when buildings and their site work are constructed by different contractors

4 Types of LEED Credits

- Credits earned by the building
- Credits earned by the site
- Shared Building/Site Credits
- Aggregate Materials Credits (both building and site materials)

LEED is set up for building with site. When building and site are by separate parties, the Government must coordinate the building and site portions of the total score.

Multiple Contractor Combined Project

- Define the Multiple Contractor Combined Project by the **scope of the site work contract**
  - All buildings that have their site work done by the site work contract are part of the Combined Project
  - Includes buildings accomplished by the site work contractor

One Score with Multiple Contractors: LEED Strategy Tables

- Prepare one table for each building/building type in Combined Project. LEED Strategy Table conveys:
  - Government strategy to achieve LEED Silver (building and site combined)
  - Status of site selection credits (brownfield, etc)
  - The minimum number of credits that building CTR, site CTR must earn
  - Contractor permissions to substitute other credits for those indicated in Government's strategy
  - Division of responsibilities for shared credits and aggregate materials credits

When complete, the same table is used in building-only contract and site work contract

LEED Strategy Table – Standard Format

LEED Credit Paragraph	LEED 2.2 Strategy Table	Building CTR Substitution Permitted	Site CTR Substitution Permitted	Required Points Strategy	YELLOW ITEMS: GD please fill in indicating whether site will earn these credits and return to COS. GREEN ITEMS: GD please review and confirm feasibility/revise as needed and return to COS. BLUE ITEMS: GD please highlight any added building and shared points proposed.
BUILDING: BRIGADE/BATTALION HQ FACILITIES					
PAR	FEATURE				REMARKS
CATEGORY 1 – SUSTAINABLE SITES					
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	NIC	NO	R	Site CTR is primary permittee. Building CTR is secondary permittee to primary permittee.
SS1	Site Selection	NIC	NO	1	Site CTR responsible.
SS2	Development Density & Community Connectivity	NIC	NO	N/A	Site CTR responsible.
SS3	Brownfield Redevelopment	NIC	NO	1	Site CTR responsible.
SS4.1	Alternative Transportation: Public Transportation Access	NIC	NO	N/A	Site CTR responsible.
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	NO	NO	1	Combined Bldg/Site credit. Site CTR responsible for bicycle storage. Building CTR responsible for shower/changing rooms.
	Alternative Transportation: Low				

LEED Strategy Tables

- Coordinate all tables in Multiple Contractor Combined Project to match for site work credits

SS4.3	OPTION 3	NO	NO		Combined Bldg/Site credit.
SS4.4	Alternative Transportation: Parking Capacity	NIC	YES	1	Site CTR responsible.
SS5.1	Site Development: Protect or Restore Habitat	NIC	YES	1	Site CTR responsible.
SS5.2	Site Development: Maximize Open Space	NIC	YES	1	Site CTR responsible.
SS8.1	Stormwater Design: Quantity Control	NIC	YES	1	Site CTR responsible.
SS8.2	Stormwater Design: Quality Control	NIC	YES	1	Site CTR responsible.
SS7.1	Heat Island Effect: Non-Roof	NIC	YES		Site CTR responsible.
SS7.2	Heat Island Effect: Roof	YES	NIC	1	Building CTR responsible.
SS8	Light Pollution Reduction	NO	NO	1	Combined Bldg/Site credit. Building CTR responsible for building lighting rqmts. Site CTR responsible for site lighting rqmts.
CATEGORY 2 – WATER EFFICIENCY					
WE1.1	Water Efficient Landscaping: Reduce	NIC	YES	1	Site CTR responsible.
WE1.2	Water Efficient Landscaping: No Potable Water Use or No Irrigation	NIC	YES		Site CTR responsible.

LEED Strategy Tables

- Coordinate division of responsibilities for materials credits

MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	NO	NO		Combined Cumulative credit. Building CTR responsible for minimum 30% recycled materials. Site CTR responsible for minimum 1% recycled materials.
MR5.1	Regional Materials: 10% Extracted, Processed & Manufactured Regionally	NO	NO	1	Combined Cumulative credit. Building CTR responsible for minimum 3% regional materials. Site CTR responsible for minimum 30% regional materials.
					Combined Cumulative credit. Building CTR responsible for minimum 6%

- No substitutions permitted on shared or aggregate credits (they in effect become mandatory or prohibited)

RFP for Multiple Contactor Combined Project

- Identify as Combined Project in Statement of Work
- Include standard LEED Combined Project Instructions appendix (MT RFP Appendix N)
- Include LEED Strategy Table(s) appendix
  - Building-only RFP: strategy table for that building/building type
  - Site work RFP: strategy table for ALL BUILDINGS in Combined Project, INCLUDING buildings by site work contractor (Instructions appendix tells him he is both bldg & site CTR for that bldg)

Technical Evaluation of Proposals for Multiple Contractor Combined Project

- Proposers have devised many ways of showing division of LEED points & responsibilities – make sure they reflect shared responsibilities
- Many do not bother – just submit a LEED Registered Project Checklist (this is easiest to review)
- LEED reviewer:
  - Look at LEED Strategy Tables in RFP to determine this proposer's overall points total requirement (ex: BLDG plus shared – usually 25 or 26 points)
  - There are more mandatory & prohibited points on LEED Strategy table – look at permitted substitutions column
  - **Compare Strategy Table to proposal to see what was switched for what, and if it is an acceptable substitution.
  - Make sure any proposed substitutions and ID credits are completely within this contractor's scope of work

Full Design Contract for Site Work for Multiple Contactor Combined Project

- Include modified version of Section 01 33 29 LEED DOCUMENTATION, edited to convey Combined Project & Contractor responsibilities per LEED Strategy Tables (contact Judy Milton for local version)
- Include LEED Strategy Table(s) as attachment to 01 33 29
- Designer of Record incorporates LEED requirements in contract documents, provides LEED Documentation for Site Design credits

Multiple Contractor Combined Project: LEED Registrations and Compiling Project Documentation

- ALL Contractors are required to use LEED Letter Templates for consistent documentation format (including site work contractor)
- REGISTERED PROJECT is defined by scope of site work – site work and non-standard buildings get templates at Registered Project (registered by Site Contractor or Government)
- REGISTERED STANDARD DESIGNS are administered by COSs – standard design buildings get templates at Registered Standard Design (registered & administered by Government (COS))
- **All parties' completed templates compiled at Registered Project**
- Selected standard design completed templates are also compiled at Registered Standard Design for future use.

Multiple Contractor Combined Project: Combining the Documentation from All Contractors

- Each contactor provides LEED documentation only for his portion of the work
- Government compiles the data from all contractors in the combined project
  - Government must administer REGISTERED PROJECT during construction (DB site work contractor may administer during design – this is – SHARED ADMINISTRATION in MT) (explained in MT RFP Appendix N)
- New option added to MT wizard Dec 08 to make site work contractor do the compiling of data from all contractors (Land Development Contractor/Site Integrator)

Questions, Feedback

- Statement of Work
- Design After Award
- Closeout
- Offeror Proposal
- Technical Evaluation, Conformed Proposal
- Multiple Contractor Combined Projects (COS)

LEED During Design Development

LEED Responsibilities

- No one person can be expert in all disciplines
- SAS: Each technical discipline is responsible for their assigned credits (SAS responsibility spreadsheet)
  - Site Development gets Waste Mgt
  - Mechanical takes coordination lead on Optimize Energy (also requires arch, elec)
- Team LEED-AP coordinates with all to ensure correct credit interpretations, complete documentation
- *Assign discipline responsibilities, coordinate regularly for holistic design development.*

SAS Technical Responsibilities Spreadsheet

EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	ALL	**Owner's Project Requirements document
		MECH, ELEC	**Basis of Design document for commissioned systems
		MECH, ELEC	**Commissioning Plan
		MECH	Verify CxA qualifications
		MECH	HVAC & controls, domestic water heating system, special system (see LEED Reference Guide) commissioning
		ELEC	Interior & exterior lighting controls, special system (see LEED Reference Guide) commissioning
EAPR2	Minimum Energy Performance (PREREQUISITE)	MECH	Mech contribution, coordinate with other disciplines
		ELEC	Elec contribution to compliance
		ARCH	Building envelope contribution to compliance
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	MECH	
EA1	Optimize Energy Performance	MECH	Mech contribution, coordinate with other disciplines
		ELEC	Elec contribution to compliance
		ARCH	Building envelope contribution to compliance

USGBC Registered Project?

- Starting FY09, Army projects must be registered and use LEED Letter Templates for LEED Documentation.
- Register project at beginning of design.
- Determine who will register project, who will administer registered project (control access privileges), and who will administer during construction.

USGBC Certified Project?

- Starting FY09, ACSIM will select a sample of Army projects to be certified by USGBC (hopefully PM for selected projects will be notified well in advance).
- Register project at beginning of design.
- Determine who will coordinate with USGBC on certification, who will pay certification fee.
- Determine whether interim review by USGBC at final design completion will be requested (recommended).

Resources: LEED-NC Reference Guide

- $110 ea at usgbc.org (member price)
- **Each Office Needs One**
- Intent, Requirements, Potential Technologies & Strategies PLUS
- Calculations, Submittal Documentation, References, Definitions, Exemplary Performance Innovation Credits
- Version 2.2, Third Edition is what we currently use
  - If you have an earlier edition of the LEED-NC Reference Guide, get Errata Sheet from usgbc.org

Resources: LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC)

- Free download at usgbc.org
- How to score projects with multiple buildings as a single project
- Aggregate credits (scored on whole job basis)
- Credits each individual building must earn
- Special scoring allowances/options/requirements for certain credits (CEP, consolidated open space, light pollution)
- Documentation for multiple building scoring
- AGMBC Cheat sheet at http:en.sas.usace.army.mil “Engineering Criteria”

Design Submittals

- Incorporate LEED requirements in drawings and specs.
- Include LEED Project Checklist, LEED documentation as separable part of Design Analysis.
- LEED design phase submittals must conform to LEED Documentation Requirements and Submittals Checklist (what and when due).
  - Excel spreadsheet located at http://en.sas.usace.army.mil, “Engineering Criteria”

LEED Documentation Requirements and Submittals Checklist - Drawings

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED 2.2 Documentation Requirements and Submittals Checklist for Government-Validated Project		Provide for Credit Audit Only	
PAR		FEATURE	DUE AT		REQUIRED DOCUMENTATION
GENERAL					
		GENERAL - All calculations shall be in accordance with LEED 2.2 Reference Guide.			
		GENERAL: Obtain excel version of this spreadsheet at http://en.sas.usace.army.mil, "Engineering Criteria".			
		GENERAL - For all credits, narrative/comments may be added to describe special circumstances or considerations regarding the project's credit approach.			
		GENERAL - Include all required LEED drawings indicated below in contract drawings with applicable discipline drawings, labeled For Reference Only.			
		NOTE: Each submittal indicated with "*" differs from USGBC certified project submittals by either having a different due date or being an added submittal not USGBC.			
			Closeout		List of all Final Design submittals revised after final design to reflect actual closeout conditions. Revised Final Design submittals. - OR - Statement confirming that no changes have been made since final design that effect final design submittal documents.
CATEGORY 1 - SUSTAINABLE SITES					
SSPR1		Construction Activity Pollution Prevention (PREREQUISITE)	**Final Design		List of drawings and specifications that address the erosion control, particulate/dust control and sedimentation control measures to be implemented.
			**Final Design		Narrative that indicates which compliance path was used (NPDES or Local standards) and describes the measures to be implemented on the project. If a local standard was followed, provide specific information to demonstrate that the local standard is equal to or more stringent than the NPDES program.

LEED Documentation Requirements and Submittals Checklist – Materials Plans

- In DBB if designer is developing the strategy, Materials Plan is required at final design and should be attached to LEED DOCUMENTATION spec
- Edit LEED Documentation Requirements and Submittals Checklist attachment to LEED DOCUMENTATION spec to reflect Contractor or Designer

MR6		Rapidly Renewable Materials	Closeout		Statement indicating total materials value and whether default or actual.
			Closeout		Spreadsheet calculations indicating, for each rapidly renewable material, material name/description, manufacturer, cost, rapidly renewable content percent, rapidly renewable product value. Total rapidly renewable product value, rapidly renewable materials percentage.
			Final Design o NLT Preconstruction		**Implementation Strategy Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.
			Closeout	X	Manufacturer published product data or certification confirming rapidly renewable material percentages in spreadsheet

(LEED Documentation & Submittals Checklist)

Materials Plans (MR credits)

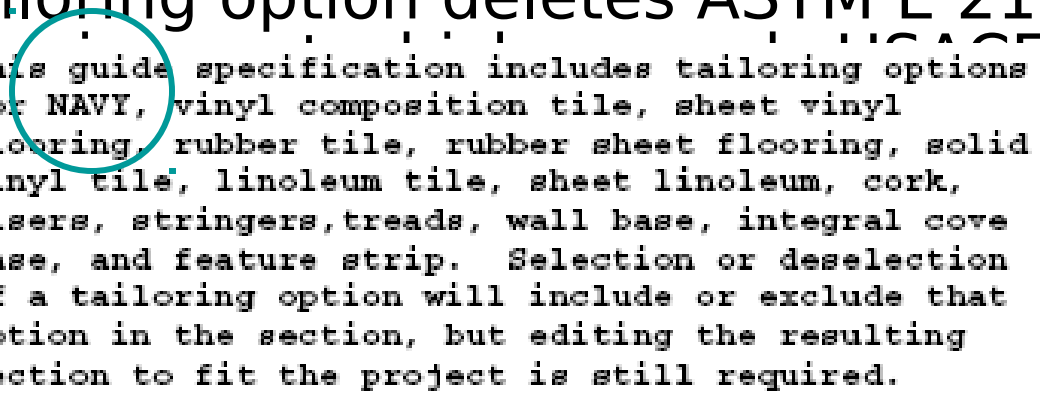
- **Always by Designer:**
  - **Rapidly Renewable Materials**
  - **Materials Reuse (incorporation of salvage)**
    - ***Designer specifies individual products to meet goal and prepares materials plan***
- **Always by Construction Contractor:**
  - **Regional Materials**
    - ***Contractor chooses products to meet goal and prepares materials plan***
- **Can Go Either Way:**
  - **Recycled Content**
  - **Certified Wood**

UFGS - Background

- 2006 joint USACE/Navy UFGS update began to add sustainable design/LEED language to UFGS.
- Needed to accommodate differences between USACE and Navy approach/desires
  - LEED Submittals: Navy - during construction (3rd party assembling documentation), USACE - big closeout submittal
  - Extent of “greening”: Navy many requirements beyond LEED, USACE only add LEED requirements
  - Performance versus prescriptive approach to some credits
- Updates are still ongoing (limited funding)

UFGS – Tailoring Option

- Navy Tailoring option (look in first specifier notes) and **deselect NAVY option**
  - Tailoring option automatically deletes the Navy in-progress submittals and adds USACE closeout submittals
  - Tailoring option automatically deletes product specs USACE was not comfortable with technically
  - Tailoring option deletes ASTM E 2129



This guide specification includes tailoring options for NAVY, vinyl composition tile, sheet vinyl flooring, rubber tile, rubber sheet flooring, solid vinyl tile, linoleum tile, sheet linoleum, cork, risers, stringers,treads, wall base, integral cove base, and feature strip. Selection or deselection of a tailoring option will include or exclude that option in the section, but editing the resulting section to fit the project is still required.

UFGS - Assumptions

- Added language was NOT vetted for availability and adequate competition. DO NOT assume that because it appears in the UFGS there are no **availability/competition issues**
  - Specifier notes were added to warn you

Use of materials with recycled content, calculated on the basis of post-industrial and post-consumer percentage content, contributes to the following LEED credit: MR4. Coordinate with Section 01 33 29 LEED(tm) DOCUMENTATION. Designer must verify suitability, availability and adequate competition (including verification of bracketed percentages included in this guide specification) before specifying product recycled content requirements.

UFGS Section 01 33 29 LEED DOCUMENTATION

- **DBB ONLY** – not suitable for DB
- Project achievement level, conformance to LEED
- Registration/LEED Letter Templates
- Implementation Plan, Closeout Notebook
- Contractor strategy options for Materials credits
- Coordination meetings (closeout)
- Attachment LEED Project Checklist

Further revisions are currently being prepared to add LEED Documentation & Submittals Checklist as attachment – do locally until then

Materials Implementation Plans

- Either designer develops strategy and specifies product by product or Contractor develops strategy

1.6.5 Materials and Resources Credit 7, Certified Wood

****

NOTE: Use the bracketed Contractor selection option if specific wood materials on the project have not been specified to be certified to meet the project goal. Using more than 50 percent of certified wood may contribute to the following LEED credit: ID1.

****

[Contractor shall select materials so that a minimum of [50][_____] percent (by dollar value) of permanently installed wood-based materials and products for the project are certified in accordance with FSC STD 01 001.]
[The following certified wood materials are specified so that a minimum of [50][_____] percent (by dollar value) of wood-based materials and products for the project are certified in accordance with FSC STD 01 001: [_____].]

(UFGS 01 33 29 LEED DOCUMENTATION)

UFGS – Regional Materials Credit

- USACE position is **DO NOT** specify regional sources on a product-by-product basis in technical sections. Require Contractor to develop and implement purchasing strategy for this credit in the LEED DOCUMENTATION section.
  - Specifier notes provide guidance

UFGS – Regional Materials Credit

- In a typical technical section:

1.6 SUSTAINABLE DESIGN REQUIREMENTS

1.6.1 Local/Regional Materials

****

NOTE: Using local materials can help minimize transportation impacts, including fossil fuel consumption, air pollution, and labor. Using materials harvested and manufactured within a 800 km (500 mile) radius from the project site contributes to the following LEED credit: MR5. Coordinate with Section 01 33 29 LEED(tm) DOCUMENTATION. Use second option if Contractor is choosing local materials in accordance with Section 01 33 29 LEED(tm) DOCUMENTATION. First option will not be used for USACE projects. Army projects will include second option only if pursuing this LEED credit.

****

[Use materials or products extracted, harvested, or recovered, as well as manufactured, within a [_____] [_____] km [500] [_____] mile radius from the project site, if available from a minimum of three sources.] [See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Flooring materials may be locally available.]

UFGS – Regional Materials Credit

- In LEED DOCUMENTATION

1.6.3 Materials and Resources Credit 5, Regional Materials

```
**************************************************************************
          NOTE:  Use the bracketed Contractor choice option if
          regional materials on the project have not been
          specified to meet the project goal.  The second
          bracketed option shall not be used on USACE
          projects.  Using more than 20 percent of local or
          regional materials may contribute to the following
          LEED credit: ID1.
**************************************************************************

 [Contractor shall select materials so that a minimum of [10][20][_____]
 percent (by dollar value) of materials and products for the project are
 extracted, harvested, or recovered, as well as manufactured, regionally
 within a 800 kilometer500 mile radius of the project site.]

 [The following technical sections include regional material requirements so
 that, if available, a minimum of [10][20][_____] percent (by dollar value)
 of materials and products for the project are extracted, harvested, or
 recovered, as well as manufactured, regionally within a 800 kilometer500
 mile radius of the project site: [_____].]
```

Recycled Content: EPA Comprehensive Procurement Guidelines (CPG)

- Mandatory for federal agencies
- If EPA designates a product, we must buy it with their recommended recycled content unless we have justification for non-use
- Contributes to LEED recycled content, but must always be done regardless of LEED
- UFGS 01 62 35 RECYCLED/RECOVERED MATERIALS – INCLUDE IN ALL PROJECTS
- Specify recycled content of EPA designated products even when Contractor Selection option is used for LEED recycled content credit.
- Example designated products: concrete, rigid and batt insulation, metal roofing

Recycled Content: EPA Comprehensive Procurement Guidelines (CPG)

- **Instructions on what to do are being added to UFGS 01 62 35 RECYCLED/ RECOVERED MATERIALS Specifier notes**

NOTE: Federal agencies are required to purchase products that, if listed on the EPA CPG, contain at least the recycled content indicated in the CPG when practicable. For construction projects, the designer must review the current CPG list and, unless designer determines that justification for non-use exists, ensure that the technical specifications for that product require at least the recycled content indicated in the CPG. The following are considered adequate justifications for non-use:

a. The product does not meet appropriate performance standards.

b. The product is not available within a reasonable time frame.

c. The product is not available competitively (from two or more sources).

d. The product is only available at an unreasonable price (compared with a comparable non-recycled content product).

Detailed information concerning EPA CPG requirements on recycled/recovered materials is available at the following URL's:

http://www.epa.gov/cpg/products/ and then click on the appropriate item from the list (building.htm for building insulation, for example).

Recycled Content: EPA Comprehensive Procurement Guidelines (CPG)

- **Specifier notes identifying EPA Designated products are being added to technical sections (ongoing)**

Shower and restroom partitions are EPA designated products for recycled content. See Section 01 62 35 RECYCLED/RECOVERED MATERIALS and include minimum recycled content unless designer determines that justification for non-use exists. EPA recycled content requirements must be addressed in all projects regardless of optional LEED/other recycled content goals. Designer must verify suitability, availability and adequate competition (including verification of bracketed percentages included in this guide specification) before specifying products meeting EPA minimum recycled content.

Special Construction Waste Management Requirements

- Currently UFGS 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT and UFGS 01 57 20.00 10 ENVIRONMENTAL PROTECTION both specify Waste Mgt Plan and they are not the same
- UFGS update to correct this, include SWAR requirement and coordinate reporting with LEED Letter Templates has been submitted (contact Judy for WORD version - see MT RFP version of ENVIRONMENTAL PROTECTION).

New Waste Management Paragraph in Several UFGS

- Specifier notes added to “reality check”
- Edit as needed regardless of brackets

3.16 WASTE MANAGEMENT

****

NOTE: Diverting waste from the landfill contributes to the following LEED credit: MR2. Coordinate with Section 02 42 00 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT. Designer will verify that items are able to be disposed of as specified.

****

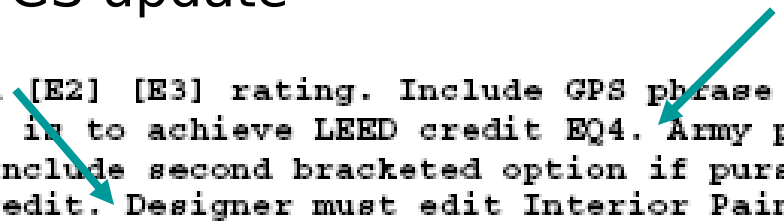
Separate offcuts and waste materials and reuse or recycle in accordance with the Waste Management Plan, keeping sheet materials larger than 0.2 square m 2 square feet and tiles larger than 1/2 tiles separate for reuse. Identify manufacturer's policy for collection or return of construction scrap, unused material, demolition scrap, and/or packaging material. [Shred scrap cork and linoleum for composting on site.]Place materials defined as hazardous or toxic waste in designated containers and dispose of properly. Close and seal tightly partly used sealant and adhesive containers and store protected in a well ventilated fire-safe area at moderate temperature.

UFGS: Fundamental Commissioning Prerequisite

- LEED Commissioning requires HVAC commissioning PLUS commissioning of
  - Lighting Controls
  - Domestic Water Heating
  - Special systems if provided (see LEED Reference Guide)
- Need to add non-HVAC commissioning requirements to specs (possible future UFGS update)
- Need to coordinate commissioning documentation for added items beyond HVAC
- NEED TO IDENTIFY, FUND CxA ACTIVITY INCLUDING PREPARATION OF COMMISSIONING REPORT AT CLOSEOUT

IEQ Low-Emitting Materials Credits

- UFGS contains language for paints
- Composite wood not included in UFGS
- Adhesives/sealants update done but not posted
- USACE bracket references LEED for VOC requirements, Navy bracket includes current LEED requirement at the time of the UFGS update



minimum [E2] [E3] rating. Include GPS phrase if project is to achieve LEED credit EQ4. Army projects shall include second bracketed option if pursuing this credit. Designer must edit Interior Paint Tables to include only products that are listed in the MPI Green Approved Products List, available at http://www.specifygreen.com/APL/ProductIdxByMPInum.asp if pursuing this credit.

****

All DFT's are minimum values.[Use only materials [with a GPS green check mark] having a minimum MPI "Environmentally Friendly" [E1] [E2] [E3] rating based on VOC (EPA Method 24) content levels.][Use only interior paints and coatings that meet VOC requirements of LEED low emitting materials credit.] Acceptable products are listed in the MPI Green Approved Products List, available at http://www.specifygreen.com/APL/ProductIdxByMPInum.asp.

Construction IAQ Management Credits

- Flushout/IAQ testing was in LEED DOCUMENTATION section. Removed (Navy to create a new spec) – new section never posted
- Recommend put back in LEED DOCUMENTATION section until new spec materializes
- Contractor creates IAQ Mgt During Construction Plan
  - HVAC Protection
  - Source Control
  - Pathway Interruption
  - Housekeeping
  - Scheduling
- Some UFGS updates include text for requirements related to this plan (but will not by themselves meet credit requirement)

at temperatures between 4 to 35 degrees C 40 to 95 degrees F. Do not store paint, polyurethane, varnish, or wood stain products with materials that have a high capacity to adsorb VOC emissions, [including _____]. Do not

UFGS Updates

- Limited HQUSACE funding available
- We need to share what we develop locally
- CCR system is broken (for this)
- Send to Judy for implementation through HQ (changes must be coordinated with other UFGS agencies)

AE Instructions

- USACE Army LEED Implementation Guide – incorporate by reference in all contracts
  - Planning Charette
  - Code 3
  - RFP Preparation
  - Full Design
- For each project provide guidance on project LEED registration/administration/certification requirement

Technical Reviews

- Same division of responsibilities as for design (if no LEED AP, assign overall items)
- Confirm completeness of LEED documentation
- Confirm inclusion of requirements in plans and specs
- Check for inconsistencies between LEED documentation and plans and specs
- Check coordination of Materials Implementation Plans & specs

MT RFP does NOT require use of UFGS for DB post-award design documents

LEED Accredited Professional

- Study LEED Reference Guide, take 2 hour test
- USGBC also offers workshops
- All multiple choice questions
- Local testing centers (Prometric)
- Costs $300 to take test, Government can reimburse you if you pass (similar to professional registration testing – coordinate with supervisor beforehand)
- Coming Spring/Summer 2009: 2 tests (LEED Associate, LEED AP),CEU requirement, biannual fee requirement

Each design team is required to have a LEED-AP. This includes in-house design teams!

Questions, Feedback

- Responsibilities, Registration, Resources
- Design Submittals
- UFGS
- AE Instructions
- Technical Reviews
- LEED AP

LEED During Construction

Current Requirements Review (Army)

- All vertical new construction/major renovation & repair – LEED Silver (min 33 points)
- Includes tenant organizations? YES
- Horizontal construction – exempt from Silver but not from LEED
- Buildings not climate controlled – exempt from Silver but not from LEED (human comfort)
- Minor renovation & repair - exempt from Silver but not from LEED
- Mandatory waste diversion 50%
- EPAct mandatory energy reduction 30%
- Certifiable - “Able to achieve USGBC certification if submitted”
- AFH & RCI: still SPIRIT “Gold”
- Required on all design & construction teams through closeout: LEED AP
- FY09 & beyond: register project w/USGBC & use Letter Templates
- Tonto’s horse?

LEED Vocabulary Review

- Certified Level, Certified, Certifiable
- USGBC Certification versus USGBC Registration
- Government Validation versus USGBC Certification
- LEED Accredited Professional (LEED AP)

Submittals

ALL PROJECTS HAVE:

- Design phase documentation (final design)
- Preconstruction phase documentation
- Documentation accumulated during construction
  - Quarterly SWAR waste management report
- Large closeout submittal

LEED Documentation Requirements and Submittals Checklist

- Point by point what and when required (for both design and construction)
- Follows USGBC with exceptions noted (USGBC interest versus USACE interest)
- Included in ALL PROJECTS
  - DBB look in 01 33 29 LEED DOCUMENTATION
  - DB look in 01 33 16 DESIGN AFTER AWARD
- Excel spreadsheet located at http://en.sas.usace.army.mil, “Engineering Criteria”

LEED Interpretation Resources

- LEED-NC Reference Guide Version 2.2

(This is the essential complete reference for LEED – Every Office Needs One! Order from usgbc.org, members price)

- Errata Sheet for LEED-NC Reference Guide Version 2.2 (usgbc.org) – 10/31/07 is most recent.
- Credit Interpretation Rulings (members area of usgbc.org) posted questions and answers from project teams – sorted by credit.
- LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC) – free download at usgbc.org – scoring for campus, multiple building projects
- Contact info for your SDD POC

Design Phase Submittals

- For many credits ALL documentation is provided by Final Design
- Be aware of the credit requirements and watch for adverse construction phase modifications

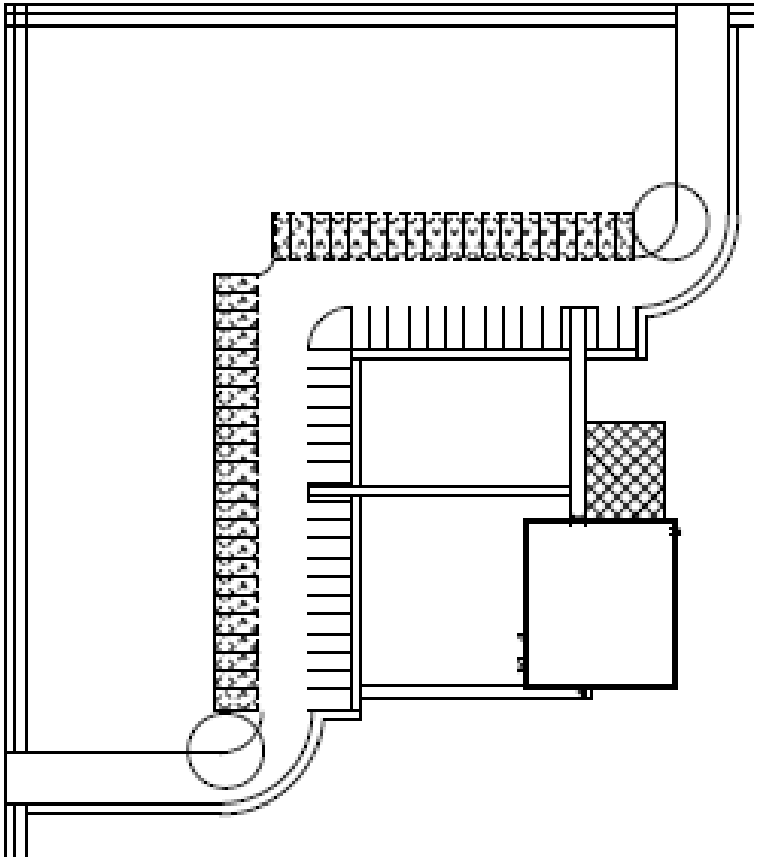
SS1		Site Selection	Final Design		Statement confirming that project does
			Final Design	X	LEED Site plan drawing that shows all boundary of all bodies of water and/or and a line depicting 5' elevation above boundary. Not required if neither cond
SS2		Development Density & Community Connectivity	Final Design		Option 1: LEED Site vicinity plan show Show density boundary or note drawir
			Final Design		Option 1: Table indicating, for project radius (keyed to site vicinity plan), site density calculation. Density radius cal within density radius.
			Final Design		Option 2: LEED Site vicinity plan show pedestrian walkways and the locations Services surrounding the project site.
			Final Design		Option 2: List (including business nan within the 1/2 mile radius, keyed to site

(LEED Documentation & Submittals Checklist)

SS Credit 7.1: Heat Island Effect: Non-Roof

Add trees, add concrete plaza and substitute open grid pavement :

- 2EA 35’dia trees (400sf shade ea)
  - $1200 add
- 7700sf open grid pavement
  - $14,000 add
- 2800sf plaza
  - $10,000 add
- Reflective/shaded required (50%): 18,655sf
- Concrete walks & plaza: 10,470sf
- Open grid pavement: 7700sf
- Vegetative shading: 800sf



Contractor wants to substitute smaller dia trees (better establishment). Is this OK?

Preconstruction Submittals

- Erosion, Sedimentation & Pollution Control Plan (part of Environmental Mgt Plan)
- Air Pollution Control Plan (part of Environmental Mgt Plan)
- Waste Management Plan (part of Environmental Mgt Plan)
- IAQ Management Plan (if pursuing this point)
- Materials Implementation Plans (if by Contractor)

Preconstruction Submittal: Construction Activity Pollution Protection Prerequisite

- Erosion, Sedimentation and Pollution Control Plan is part of Environmental Mgt Plan
- Air Pollution Control Plan is part of Environmental Mgt Plan
- Look in ENVIRONMENTAL PROTECTION spec (same as NPDES)

e. An Erosion, Sedimentation, and Pollution Control Plan (ESPCP) must be prepared and certified in accordance with the General NPDES Permit No. GAR100001. The plan will identify an appropriate and comprehensive system and design of Best Management Practices (BMPs) required to control erosion and sedimentation runoff from construction activities and sampling and monitoring requirements. The plan

m. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site.

In accordance with Georgia Water Quality Control Act (GWQCA) of 1964 and the Manual for Erosion and Sediment Control in Georgia (Latest Edition).

(UFGS ENVIRONMENTAL PROTECTION)

Preconstruction Submittal: Construction Waste Management Credit

- Waste Mgt Plan is part of Environmental Mgt Plan
- Look in ENVIRONMENTAL PROTECTION spec

1.2.3.11. A Solid Waste Management Plan identifying waste minimization, collection, and disposals methods, waste streams (type and quantity), and locations for solid waste diversion/disposal including clearing debris and C&D waste that is diverted (salvaged, reused, or recycled). The plan shall detail the contractor's actions to comply with, and to participate in, Federal, state, regional, local government, and installation sponsored recycling programs to reduce the volume of solid waste at the source. The Contractor shall identify any subcontractors responsible for the transportation, salvage and disposal of solid waste. Licenses or permits shall be submitted for solid waste disposal sites that are not a commercial operating facility. Evidence of the facility's ability to accept the solid waste shall be attached to this plan. A Construction and Demolition Waste Management Plan, similar to the plan specified in the UFGS 01 74 19 (formerly 01572) may be used as the non-hazardous solid waste management plan. The Contractor shall provide a Non-hazardous Solid Waste Diversion Report. The

(UFGS ENVIRONMENTAL PROTECTION)

Preconstruction Submittal: IAQ Management During Construction Credit

- IAQ Management Plan has 5 components:
  - HVAC Protection
  - Source Control
  - Pathway Interruption
  - Housekeeping
  - Scheduling
- Must comply with SMACNA IAQ Guidelines for Occupied Buildings Under Construction, 1995, Chapter 3 (EVEN THOUGH UNOCCUPIED).

EQ3.2		Construction IAQ Management Plan: Before Occupancy	""Preconstruction		Construction IAQ Management Plan

(LEED Documentation & Submittals Checklist)

Preconstruction Submittals: Materials Credit Implementation Plans

- Materials implementation plans may be Designer or Contractor responsibility
  - If not done by Designer it is a Contractor Preconstruction submittal.

MR6		Rapidly Renewable Materials	Closeout		Statement indicating total materials value and whether default or actual.
			Closeout		Spreadsheet calculations indicating, for each rapidly renewable material, material name/description, manufacturer, cost, rapidly renewable content percent, rapidly renewable product value. Total rapidly renewable product value, rapidly renewable materials percentage.
			Final Design or NLT Preconstruction		**Implementation Strategy Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.
			Closeout	X	Manufacturer published product data or certification confirming rapidly renewable material percentages in spreadsheet

(LEED Documentation & Submittals Checklist)

Preconstruction Submittals: Materials Credit Implementation Plans

- Always by Designer:
  - Rapidly Renewable Materials
  - Materials Reuse (incorporation of salvage)
- Always by Construction Contractor:
  - Regional Materials
- Can Go Either Way:
  - Recycled Content
  - Certified Wood

Materials Implementation Plans

- **Look in LEED Documentation spec. to see if designer or Contractor is responsible**

1.6.5 Materials and Resources Credit 7, Certified Wood

****

NOTE: Use the bracketed Contractor selection option if specific wood materials on the project have not been specified to be certified to meet the project goal. Using more than 50 percent of certified wood may contribute to the following LEED credit: ID1.

****

[Contractor shall select materials so that a minimum of [50][_____] percent (by dollar value) of permanently installed wood-based materials and products for the project are certified in accordance with FSC STD 01 001.]
[The following certified wood materials are specified so that a minimum of [50][_____] percent (by dollar value) of wood-based materials and products for the project are certified in accordance with FSC STD 01 001: [_____].]

(UFGS LEED DOCUMENTATION)

Submittals During Construction

- **MT, UFGS and LEED are all set up for a large closeout submittal (formal LEED submittals are not required during construction)**
- **Contractor is required to update LEED documentation monthly during construction & have it available on site for review at all times**
  - **YOU DETERMINE FREQUENCY OF GOVT REVIEW**
  - **WILL NOT COME TO YOUR OFFICE**
  - **Recommend review monthly (treat like as-builts)**

Submittals During Construction

- **Individual credits will have surges in data collection at different points in project**
  - **Waste diversion heavy during demolition**
  - **Low VOC paint, carpet, interior sealants, composite wood when these products are purchased for interior use/installation**
  - **Materials credits (recycled content, regional, certified wood) per Implementation Plans**
  - **Construction IAQ during construction at/following HVAC installation**
  - **BE AWARE OF WHAT CREDITS RECENT WORK RELATES TO AND REVIEW DOCUMENTATION FOR THOSE CREDITS**

Much harder to catch up on documenting old work than to keep up as yo

Submittals During Construction: SWAR Waste Management Reports

- SWAR is Army solid waste reporting system – need to furnish Contractor's quarterly and closeout waste diversion reports to your Installation SWAR coordinator when received
- Quarterly report requirement is in ENVIRONMENTAL PROTECTION spec and LEED Documentation & Submittals Checklist

Activities During Construction

- Periodic review of Contractors documentation
  - Being kept current monthly
  - Materials credits on track for required percentages
- Conformance to Implementation Plans
- Review proposed changes for effect on LEED credits
- Spot-check special materials requirements (paint & sealant VOC labels)
- Compare products seen in field to documentation spreadsheets on what is being used
- Compare FIO submittals to documentation

Activities During Construction: MT Construction Submittals

- **MT requires FIO Government submittal for all DOR Approval submittals AFTER DOR approval**
  - **Extensions of design**
  - **Critical materials**
  - **Deviations from solicitation, accepted proposal or completed design (includes changes to products named in accepted proposal)**
  - **Equipment whose compatibility with entire system must be checked**
- **MT requires government review of deviations prior to proceeding**
- **MT requires government concurrence on deviations to completed design before proceeding**

These are the submittals you will get during construction (look in spec SUBMITTAL PROCEDURES)

Closeout

Large LEED closeout submittal

- DB: complete documentation package design & construction
- DBB all construction phase documentation (design phase by others)

Closeout

- Pre-closeout & closeout meeting
- Installation Representative participates
- Formal endorsement of final score by all parties

1.8 LEED REVIEW MEETINGS

Pre-Closeout Meeting. Approximately 30 days before submittal of LEED closeout documentation, the Contractor and the Government's project delivery team (including installation representative) will meet to review the documentation, determine which, if any, credits will be audited and identify any corrections/missing items prior to the closeout LEED documentation submittal.

Approximately 14 days after submittal of LEED closeout documentation, the Contractor and the Government's project delivery team (including installation representative) will meet to review the LEED closeout documentation. The review conference will include discussion of and resolution of all review comments to ensure consensus on achievement of credits and satisfactory documentation. At the review conference a final score will be determined and endorsed in writing by all parties.

(UFGS CLOSEOUT SUBMITTALS)

Closeout (all projects): Registered Project Administration

- Registered project contains all design and construction phase LEED documentation
- Copy and retain completed set of LEED documentation in USACE project file
- Transfer administration to Installation if desired (needed if Installation decides to seek USGBC certification or register building for LEED-EB) or de-activate online project (call USGBC)

Multiple Contractor Combined Project

- ONLY when buildings and their site work are constructed by different contractors
  - Occurs at complexes that contain more than one standard design
  - Occurs when standard design task order is for building only and site work is under another contract
- Government must coordinate building and site points between contractors to achieve minimum score.

One Score with Multiple Contractors: LEED Strategy Tables

- One table for each building/building type in Combined Project:
  - Government strategy to achieve LEED Silver (building and site combined)
  - Status of site selection credits (brownfield, etc)
  - The minimum number of credits that building CTR, site CTR must earn
  - Contractor permissions to substitute credits for those indicated in Government's strategy
  - Division of responsibilities for shared credits and aggregate materials credits

Same table is used in both bldg and site work contrac

LEED Strategy Table

LEED Credit Paragraph	LEED 2.2 Strategy Table	Building CTR Substitution Permitted	Site CTR Substitution Permitted	Required Points Strategy	YELLOW ITEMS: GD please fill in indicating whether site will earn these credits and return to COS. GREEN ITEMS: GD please review and confirm feasibility/revise as needed and return to COS. BLUE ITEMS: GD please highlight any added building and shared points proposed.
BUILDING: BRIGADE/BATTALION HQ FACILITIES					
PAR	FEATURE				REMARKS
CATEGORY 1 – SUSTAINABLE SITES					
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	NIC	NO	R	Site CTR is primary permittee. Building CTR is secondary permittee to primary permittee.
SS1	Site Selection	NIC	NO	1	Site CTR responsible.
SS2	Development Density & Community Connectivity	NIC	NO	N/A	Site CTR responsible.
SS3	Brownfield Redevelopment	NIC	NO	1	Site CTR responsible.
SS4.1	Alternative Transportation: Public Transportation Access	NIC	NO	N/A	Site CTR responsible.
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	NO	NO	1	Combined Bldg/Site credit. Site CTR responsible for bicycle storage. Building CTR responsible for shower/changing rooms.
	Alternative Transportation: Low				

LEED Strategy Table

- Indicates division of responsibilities for materials credits
  - These % are a guess – monitor and adjust as needed during construction to achieve project total

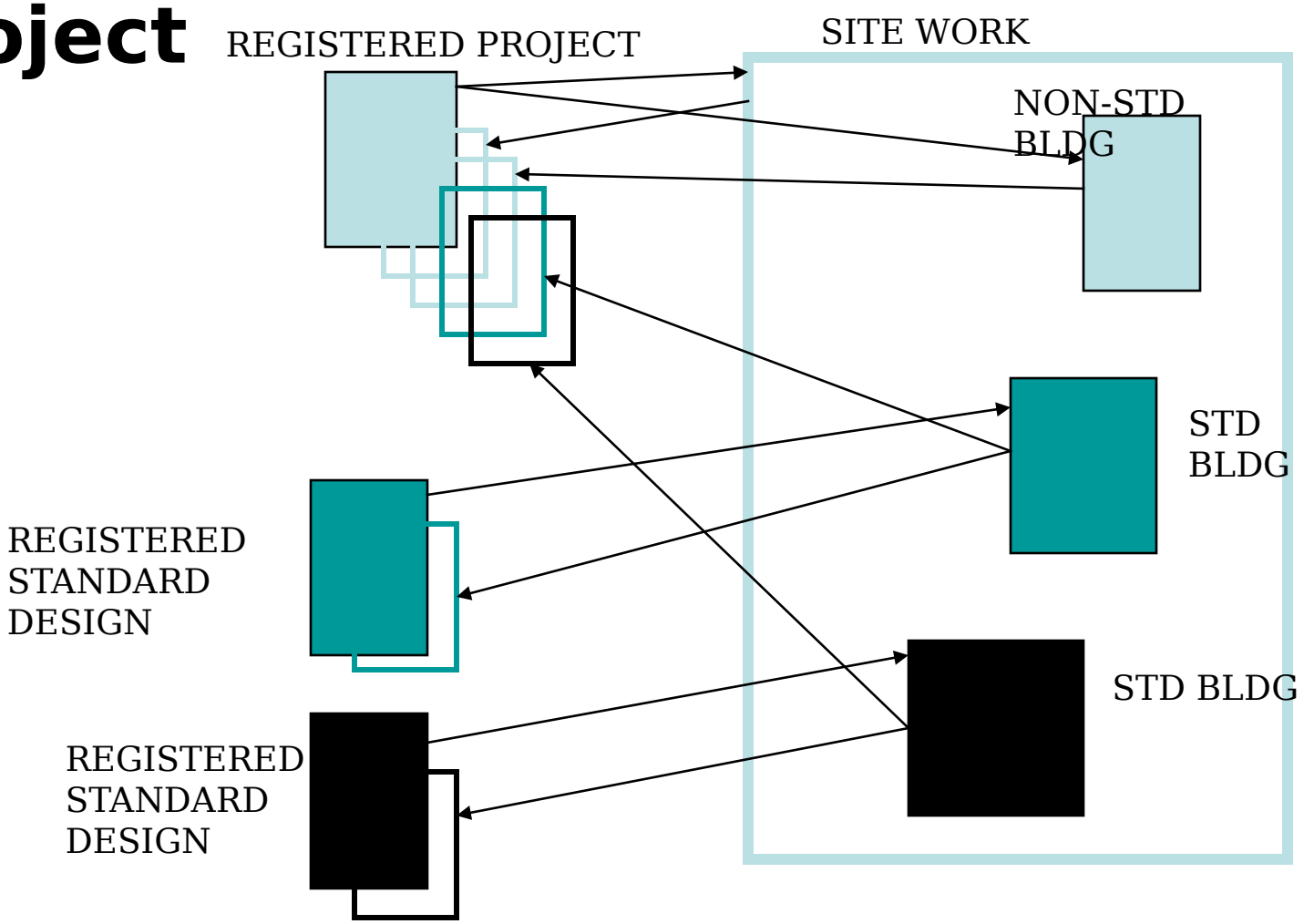
MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	NO	NO		Combined Cumulative credit. Building CTR responsible for minimum 20% recycled materials. Site CTR responsible for minimum 1% recycled materials.
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally	NO	NO	1	Combined Cumulative credit. Building CTR responsible for minimum 3% regional materials. Site CTR responsible for minimum 30% regional materials.
					Combined Cumulative credit. Building CTR responsible for minimum 8%

- No substitutions permitted on shared or combined cumulative credits (become mandatory)

Multiple Contractor Combined Project: LEED Registrations

- ALL Contractors are required to use LEED Letter Templates for consistent documentation format
- REGISTERED PROJECT is defined by scope of site work – site work and non-standard buildings get templates at Registered Project
- REGISTERED STANDARD DESIGNS are administered by COSs – standard design buildings get templates at Registered Standard Design
- All parties' completed templates compiled at Registered Project.

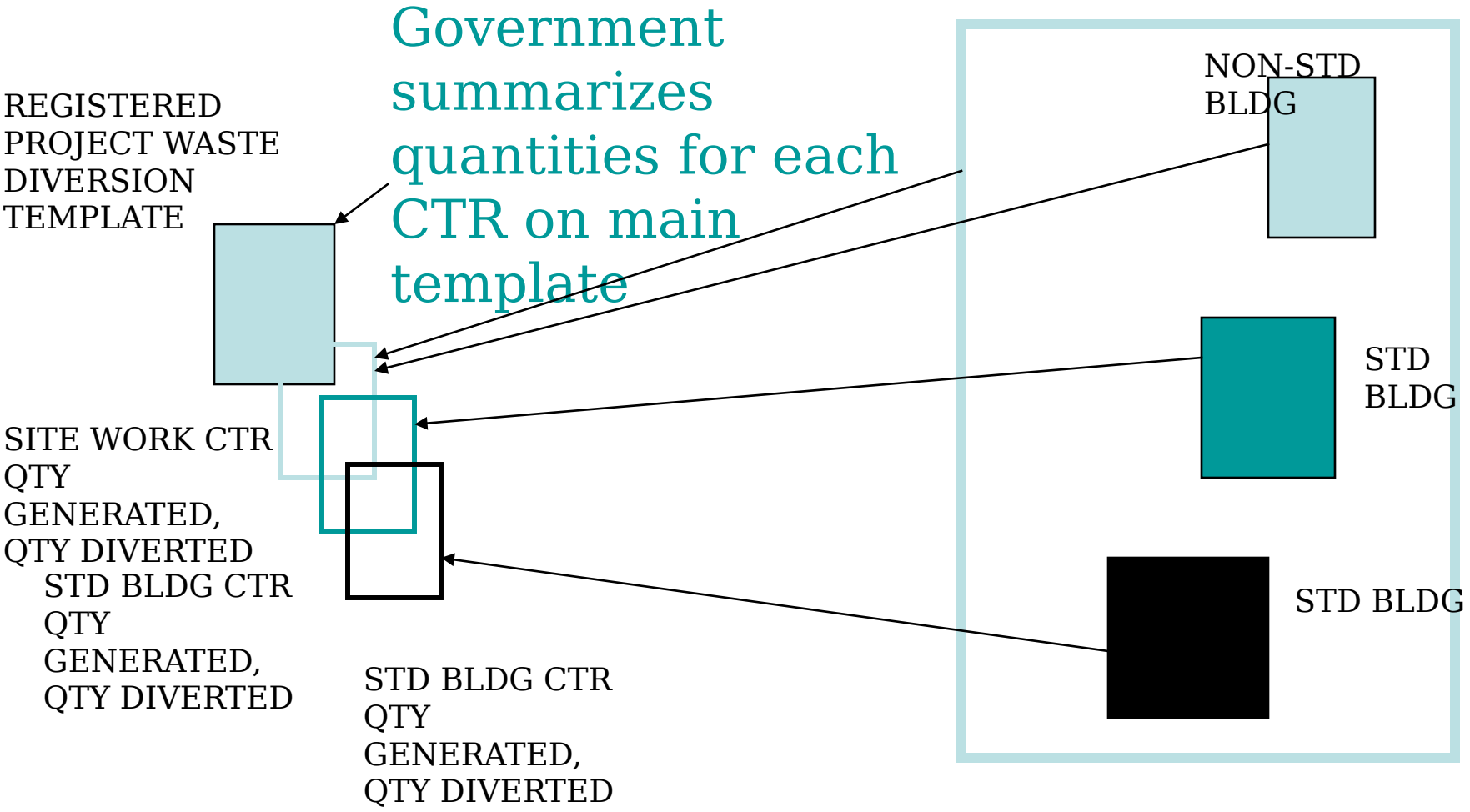
Multiple Contractor Combined Project



Multiple Contractor Combined Project: Combining Data

- Government combining data: Government must administer Registered Project during construction (contractor may administer during design)
- Site Contractor combining data: must be a contract requirement (this option added to MT JAN 09 – Appendix N explains)
  - Shared Building/Site Credits: attach each contractor's partial data to blank original
  - Aggregate Materials Credits: create summary including each contractor's data at blank original and attach each contractor's data to summary original

Combining Data – Waste Diversion


Government summarizes quantities for each CTR on main template
REGISTERED PROJECT WASTE DIVERSION TEMPLATE
SITE WORK CTR QTY GENERATED, QTY DIVERTED
STD BLDG CTR QTY GENERATED, QTY DIVERTED
STD BLDG CTR QTY GENERATED, QTY DIVERTED
NON-STD BLDG
STD BLDG
STD BLDG

This requirement applies to 3 to 4 Materials credits

LEED Construction Credits

LEED credits that receive heavy emphasis during construction phase

Practical Examples from a QA

- Incorporate LEED® into all preparatory meetings
- Incorporate LEED® into all weekly safety briefings
- Consider LEED® like Safety – look for it every time you're in the field

Documentation

MR Credit 4 / MR Credit 5

FT LEWIS FY05 Whole Barracks Renewal

Materials Table

					MR Credit 4					MR Credit 5		
Description of Material		Vendor	Back Up Provided	Material Cost (Less Labor & Equipment)	Recycled Content			Local/Regional Materials				
					Post-Consumer	Post-Industrial	Value	Location	Distance	Credit 5.1 Manufacture	Location	
				[$]	[%]	[%]	[$]			[$]		
02	SITEWORK											
03	CONCRETE						$0					
03200	Rebar	Addison Construction - Nucor and Casecad	Yes	$165,366	71%	27%	$139,734	McMinnville	167	$165,366		
04	MASONRY						$0					
05	METALS						$0					
05120	Structural Steel	Allied Steel	Yes	1,235,300.00	80%	7%	$1,031,476					
05500	Miscellaneous - Stainless Stee	Kadee Industries	Yes	12,806.00		90%	$5,763	NA			NA	
05210	Steel Joists	Scafco - USS Posco	Yes	278,400.00		68%	$94,656	NA			NA	
06	WOODS & PLASTICS						$0					
06415	Custom Casework	Westmark - Roseberg Forest Products	Yes	$430,095		100%	$215,048					
07	THERMAL / MOISTURE PROTECTION						$0					
07210	Building Insulation	SCS - Owens Corning	Yes	$167,015	9%	26%	$36,743					
07322	Concrete Tile Roofing	Monier Lifetile	Yes	$174,889		4%	$3,498	Lakewood, WA	8	$174,889	within 500	
07413	Metal Siding	AEP Span	Yes	$374,469	25%	0%	$93,617	Tacoma, WA	15	$374,469	NA	
08	DOORS & WINDOWS						$0					
08110	Steel Doors and Frames	American Direct	Yes	$154,461	23%	7%	$40,932	NA			NA	
08120	Aluminum Doors and Frames	Traco	Yes	$28,145	0%	25%	$3,518	NA			NA	
08210	Wood Doors	American Direct	Yes	$47,222	0%	60%	$14,167	NA			NA	
08520	Aluminum Windows	Traco	Yes	$228,063	0%	15%	$17,106	NA			NA	
08625	Aluminum Framed Skylights	Dea Mor	Yes	$103,608	0%	24%	$12,433	Vancouver, WA	120	$103,608	NA	
08800	Glazing	Dea Mor	Yes	$103,608	0%	20%	$10,361	Seattle, WA	45	$103,608	NA	
09	FINISHES						$0					
09510	Accoustical Ceilings	Armstrong	Yes	$63,000	0%	82%	$25,830					
09650	Resilient Flooring	Johnsonite	Yes				$0					
09990	Paints	Sherwin Williams	Yes	$53,980	NA	NA	$0	Tumwater, WA	20	$53,980		
09990	Paints	Sound Coatings	Yes		NA	NA	$0	Centralia, WA	40	$0		
10	SPECIALTIES						$0					
10990	Miscellaneous - Rollout Mat	Kadee Industries	Yes	$12,046		50%	$3,012	NA		$0	NA	
				TOTAL			$1,747,893			$375,920		

Total Materials Cost		$9,148,875
Percentage of Recycled Content	(MR Credit 4.1 and 4.2) - NEED 15%	19%
Local/Regional Materials Percentage	(MR Credit 5.1) - NEED 40%	11%

17.00 x 11.00 in

SSPR1: Construction Activity Pollution Prevention Prerequisite

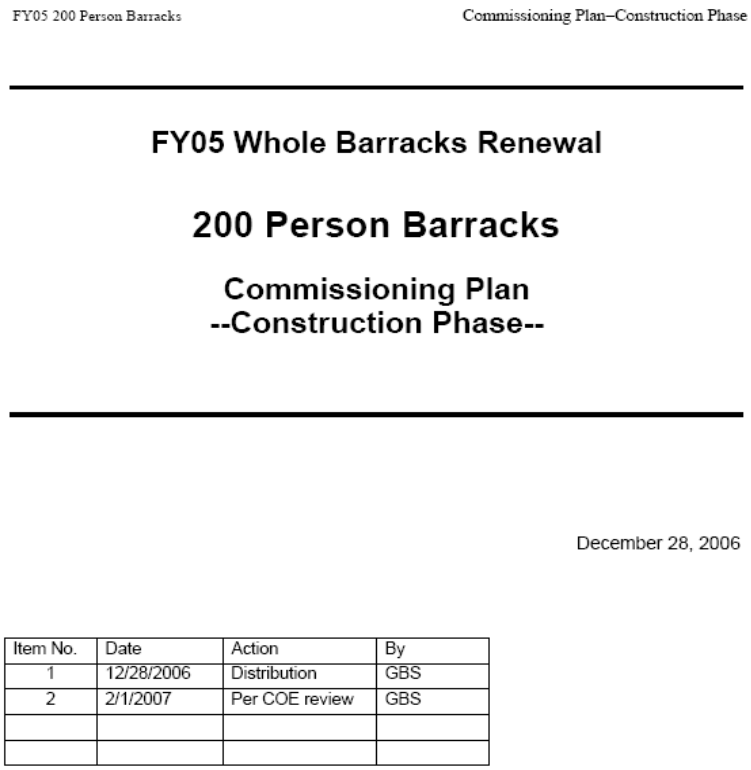
Intent:

Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation

Requirement:

Create and follow an Erosion and Sedimentation Control Plan that meets NPDES, regardless of site size

Fundamental Commissioning Prerequisite



FY05 200 Person Barracks — Commissioning Plan–Construction Phase

FY05 Whole Barracks Renewal

200 Person Barracks

Commissioning Plan
--Construction Phase--

December 28, 2006

Item No.	Date	Action	By
1	12/28/2006	Distribution	GBS
2	2/1/2007	Per COE review	GBS

- **LEED requires (as a minimum) commissioning of HVAC & controls PLUS lighting controls PLUS domestic water heating**
- **CxA varies by project – MT by Contractor, DBB by in-house staff or consultant**
- **CxA can change during course of project, may be employee of/hired by designer or construction contractor**
- **Commissioning Plan updated during construction**
- **Commissioning Report**

MR Credits 2.1 & 2.2: Construction Waste Mgt

Requirement:

Credit MR2.1 – Recycle or divert at least **50%** of non-hazardous construction and demolition debris **(MANDATORY ARMY PROJECTS)**.

Credit MR2.2 – Same as 2.1 but take BOTH points if **75%**.

Notes:

- LEED allows calculation by weight or volume, Army needs it in weight for it's reporting requirement (in MT wizard).
- Army (SWAR) and Air Force need quarterly and final reports with tickets (in MT wizard). Obtain from contractor, forward to installation coordinator.
- Waste mgt plan requirements are in MT Environmental Protection Plan spec.
- CANNOT include excavated soil and land-clearing debris (vegetation, rocks).
- MUST be generated on-site (no source reduction).
- CAN include charities, salvagers, recyclers, deconstruction, reuse on-site (rubble, asphalt).
- Renovations that don't qualify for MR1 can count reused materials in this credit (not both credits).
- Exclude hazardous materials from calculation.

Construction Waste Management Credit

- Commingled and/or separate materials collection receptacles
- Better use if conveniently located, marked
- Subcontractors need to know recycling is required
- Check receptacles occasionally for appropriate materials

MR Credits 4.1 & 4.2: Recycled Content

Requirement:

Credit MR4.1 – Use materials with recycled content so that the sum of post-consumer recycled content plus one-half of the post-industrial content constitutes at least 10%, based on cost, of the total value of materials on the project.

Credit MR4.2 – Same as 3.1 but take BOTH points if 20%.

Notes:

This is for incorporating new materials with recycled content.

Related to but IN ADDITION TO EPA CPG recycled content mandate requirements (individually specified).

See LEED Reference Guide for composite/partial calculations.

Building materials heavy contribution to total (concrete, steel, metals)

Multiple Contractor projects: division of percentage

Recycled Content

TOUGHROCK®

Georgia-Pacific Gypsum

Georgia-Pacific Gypsum Sustainable Materials Data Sheet

(See MSDS for additional information)

SECTION 1 Product and Company Identification

Product Name: ToughRock® Gypsum Board. Performance based qualities of this product based upon material composition are obtained by referencing ASTM C 36 and ASTM C 1396.

Product Use: Paper face and back non-combustible gypsum core for interior walls and ceiling applications.

Manufactured by:

Georgia-Pacific Gypsum LLC
133 Peachtree Street
Atlanta, GA 30303
(800) 225-6119 (Technical Information)
(404) 652-5119 (MSDS Request)

Georgia-Pacific Canada, Inc.
Allanburg Road
Thorold, Ontario L2V 3ZB, Canada
(800) 225-6119 (Technical Information)
(404) 652-5119 (MSDS Request)

SECTION 2 Recycled Content *(Percentages are by Weight and Vary by Location) (*LEED Recycled Content Credit 4.1)*

Manufacturing Location	Total Recycled Content	Pre Consumer Recycled Content	Post Consumer Recycled Content
Acme, TX	6%	4%	2%
Antioch, CA	6%	4%	2%
Blue Rapids, KS	6%	4%	2%
Brunswick, GA	6%	4%	2%
Caledonia, ON, Canada	8%	6%	2%
Camden, NJ	6%	4%	2%
Edmonton, AB, Canada	10%	8%	2%
Ft. Dodge, IA	6%	4%	2%
Las Vegas, NV	7%	5%	2%
Lovell, WY	6%	4%	2%
Long Beach, CA	6%	4%	2%
Newington, NH	6%	4%	2%
Savannah, GA	6%	4%	2%
Sigurd, UT	6%	4%	2%
Surrey, BC	21%	19%	2%
Sweetwater, TX	6%	4%	2%
Wheatfield, IN	96%	94%	2%
Tacoma, WA	42%	40%	2%

Plants are being added on an on-going basis. Please call the technical information line to determine if a closer plant has been brought on-line.

MR Credits 5.1 & 5.2: Regional Materials

Intent:

Increase demand for building products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

Requirement:

Credit MR5.1 – Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the projects site for a minimum of 10%, based on cost, of the total value of materials on the project.

Credit MR5.2 – Same as 3.1 but take BOTH points if 20%.

Notes:

ALWAYS contractor responsibility (01 33 29).

See LEED Reference Guide for composite/partial calculations.

Site materials heavy contribution to total - Multiple Contractor projects: division of percentage between contractors in LEED Strategy Table, must combine data from all contractors to determine project total (GD

MR Credit 6: Rapidly Renewable Materials

Intent:

Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

Requirement:

Use rapidly renewable building materials and products (made from plants that are typically harvested within a ten-year cycle or shorter) so that the sum of these materials constitutes at least 2.5%, based on cost, of the total value of materials on the project.

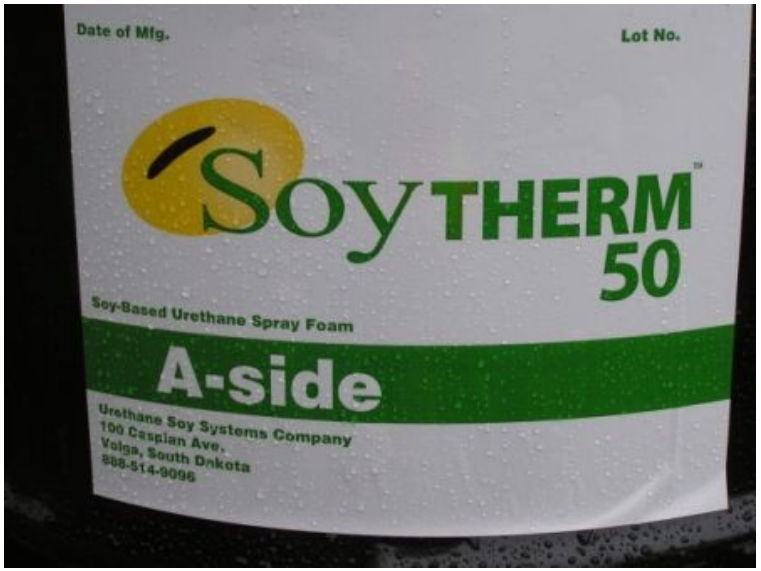
Notes:

ALWAYS Designer responsibility –materials are specified, implementation strategy attached to LEED DOCUMENTATION spec.

Examples: bamboo, linoleum, cork, wheatboard, strawboard, cotton or soy insulation.

Difficult on large new construction.

Rapidly Renewable Materials Credit

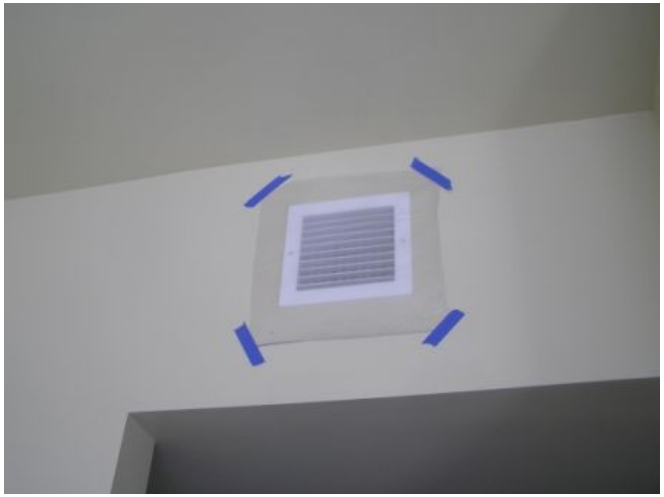


- May see new and unfamiliar materials
- Familiarize yourself with manufacturer requirements

Construction IAQ Management During Construction

Credit

- Meet or exceed SMACNA IAQ Guidelines for Occupied Buildings Under Construction, 1995, Ch 3 EVEN THOUGH UNOCCUPIED.
- Conformance to IAQ Management Plan
- Proper storage of absorptive materials
- Protection of ductwork
- Filter replacement prior to occupancy



NOTE: This credit requires jobsite photos for

EQ Credit 3.2: Construction IAQ Mgt Before Occupanc

Requirement:

Option 1 – Flush-out

- **After construction ends and all interior finishes are installed and prior to occupancy, perform building flush-out by supplying total air volume of 14,000cf outdoor air per sf floor area, maintaining minimum 60 degrees temperature and maximum 60% relative humidity.**

  OR

- **Optional flush-out sequence for occupancy during flush-out.**

OR

Option 2 – Air Quality Testing

Conduct baseline IAQ testing after construction ends and all interior finishes are installed and prior to occupancy, using protocols and meeting concentration limits in LEED Reference Guide. Flush-out and re-test if tests fail.

Notes:

Include in construction schedule

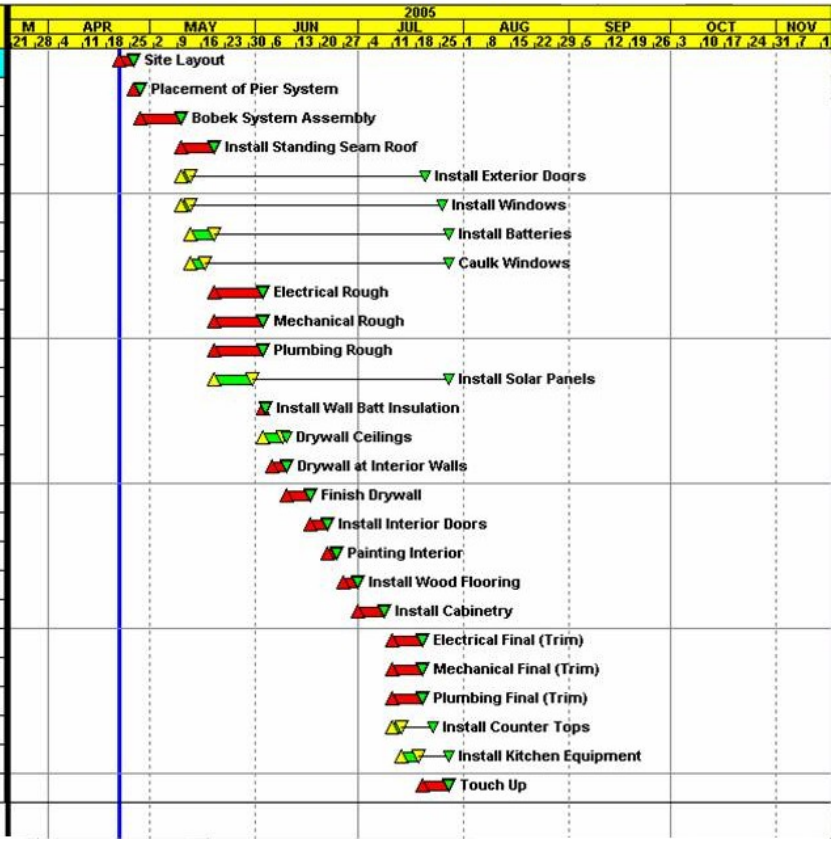
Can give contractor option of flush-out or testing.

Punch-out and cleaning must be complete before starting flush-out. Can be commissioning if it does not introduce contaminants.

Construction IAQ Mgt Before Occupancy Credit (flush-out or IAQ testing)

- Need to accommodate in project schedule

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
010	Site Layout	2	22APR05	25APR05
020	Placement of Pier System	2	26APR05	27APR05
030	Bobek System Assembly	8	28APR05	09MAY05
070	Install Standing Seam Roof	8	10MAY05	19MAY05
050	Install Exterior Doors	3	10MAY05	12MAY05
040	Install Windows	3	10MAY05	12MAY05
085	Install Batteries	5	13MAY05	19MAY05
060	Caulk Windows	2	13MAY05	16MAY05
090	Electrical Rough	10	20MAY05	02JUN05
100	Mechanical Rough	10	20MAY05	02JUN05
110	Plumbing Rough	10	20MAY05	02JUN05
080	Install Solar Panels	7	20MAY05	30MAY05
125	Install Wall Batt Insulation	1	03JUN05	03JUN05
120	Drywall Ceilings	4	03JUN05	08JUN05
130	Drywall at Interior Walls	4	06JUN05	09JUN05
140	Finish Drywall	5	10JUN05	16JUN05
150	Install Interior Doors	3	17JUN05	21JUN05
160	Painting Interior	3	22JUN05	24JUN05
170	Install Wood Flooring	4	27JUN05	30JUN05
180	Install Cabinetry	6	01JUL05	08JUL05
210	Electrical Final (Trim)	7	11JUL05	19JUL05
220	Mechanical Final (Trim)	7	11JUL05	19JUL05
230	Plumbing Final (Trim)	7	11JUL05	19JUL05
190	Install Counter Tops	3	11JUL05	13JUL05
200	Install Kitchen Equipment	3	14JUL05	18JUL05
240	Touch Up	6	20JUL05	27JUL05



EQ Low-Emitting Materials Credits

Intent:

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirement:

Adhesives and Sealants Credit

Paints & Coatings Credit

Carpet Credit (with alternative for hard flooring)

Composite Wood & Agrifiber Credit

Notes:

VOC content except urea formaldehyde for composite wood

Most are Field-applied only.

VOC budget Alternate Compliance Path available (individual noncompliant products with overall low VOC performance).

Indoor Environmental Quality (EQ) Low-Emitting Materials Credits

Low-emitting materials credits include everything inside the exterior surface covering, including wall cavities, attics, above ceilings, ductwork. See LEED Reference Guide Supplemental Information section on these credits.

Low Emitting Materials Credits

- Take a picture of label
- Compare to requirement (LEED Reference Guide)

ACRYLPRO
CERAMIC TILE ADHESIVE
Adhesivo para Azulejos y Baldosas de Cerámica
For wall and floor tile installations
Para instalaciones de baldosas y azulejos en pisos y paredes
Just spread and set
Sets porcelain, ceramic, marble and stone tile

Low VOC Adhesives

VOC Limit*, Less Water and Less Exempt Compounds in Grams per Liter

Architectural Applications	Current VOC Limit
Indoor Carpet Adhesives	50
Carpet Pad Adhesives	50
Outdoor Carpet Adhesives	150
Wood Flooring Adhesive	100
Rubber Floor Adhesives	60
Subfloor Adhesives	50
Ceramic Tile Adhesives	65
VCT and Asphalt Tile Adhesives	50
Dry Wall and Panel Adhesives	50

Adhesives And Sealers

Zoom Out

V-11 Adhesive
Vinyl Composition Tile (VCT) & Premium Visual Tile (PVT) Adhesive
VCT: Essentials™ / Designer Essentials® / PVT: Inspirations™ / Brushwork™
Brushwork™ Brights / ColorPoint™ / SolidPoint™ / SafeWalks™

DESCRIPTION

V-11 is a solvent-free premium latex adhesive developed specifically for installing Mannington Commercial Vinyl Composition Tile. V-11 is nonflammable and provides a strong moisture-resistant and alkali-resistant bond. You may use it on all approved wood underlayments and on, above, or below-grade concrete substrates. Refer to Mannington Professional Installation Guide.

FEATURES

- Easy application
- VOC-compliant / solvent-free / low odor
- Non-flammable
- Moisture- and alkali-resistant
- Readily identifiable mylar chips
- Contains fungicide protection
- Complies with SCAQMD Rule 1168

Education is Critical

- Government field team needs to know what to look for
- Contractor and subcontractor teams need to know what to do

LEED Accredited Professional

Demonstrated knowledge through testing

Correct interpretation of credits

At least one LEED AP in each district

Contractor has to have one

You need one too

SAS GOAL: At least ONE LEED AP at each Resident/Project Office

Questions, Feedback

- Requirements Review
- Submittals
- Preconstruction
- During Construction
- Closeout
- Multiple Contractor Combined Projects
- LEED Construction Credits
- LEED AP

That's It!

- **Thank you** for your time and attention
- To receive continuing education certificate YOU MUST SIGN SEPARATE ATTENDANCE SHEET AT CLOSE OF WORKSHOP
- Your certificate will be emailed to you within a week or two of the class
- Please turn in comment and suggestion forms if you have any
- Feel free to contact your instructor if you have additional comments/questions afterward